

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

AGERE SYSTEMS, INC., ET AL.,

Plaintiffs,

v.

ADVANCED ENVIRONMENTAL
TECHNOLOGY CORPORATION, ET AL.,

Defendants.

CIVIL ACTION

FILED AUG 18 2008

NO. 02-3830

ENTERED

AUG 18 2008

CLERK OF COURT

FINDINGS OF FACT AND CONCLUSIONS OF LAW

I. Introduction

The present action was filed under the Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 U.S.C. § 9601, *et seq.*, ("CERCLA") and the Pennsylvania Hazardous Sites Cleanup Act, 35 Pa. Cons. Stat. § 6020.101 *et seq.*, ("HSCA") for the recovery of past and future costs incurred as a result of the release, and threatened release, of hazardous substances at the Boarhead Farms Superfund Site (the "Site").

Beginning in approximately 1972, DeRewal Chemical Corporation began an extended course of illegal dumping and disposal of chemical wastes at the Site. In varying degrees, this practice continued until 1977. In the early 1980s, the Environmental Protection Agency ("EPA") began investigating the Site and in 1989 Boarhead Farms was listed on the National Priorities List. Around this time, EPA began issuing General and/or Special Notice Letters to potentially responsible parties ("PRPs") whose waste EPA believed was present at the Site. In February 2000, plaintiffs Cytec Industries, Inc. ("Cytec"), Ford Motor Company ("Ford") and SPS Technologies, LLC ("SPS") entered into a Consent Decree agreeing to perform the first operable

unit of the Record of Decision (“ROD”) and to reimburse EPA for its administrative and oversight costs related to this work. Plaintiffs Cytec, Ford, SPS, TI Group Automotive Systems LLC (“TI”) and Agere Systems, Inc. (“Agere”) then entered into an agreement with NRM Investment Company (“NRM”) and Worthington Steel Company whereby these entities agreed to collectively fund and perform the first operable unit of the ROD.

Cytec, Ford, SPS, and TI thereafter entered into a second Consent Decree, agreeing to fund, implement and administer the second operable unit of the ROD, to reimburse EPA for past costs and to pay for EPA’s future response costs related to the OU-2 work. Plaintiffs Cytec, Ford, SPS, TI, and Agere then entered into an agreement to collectively fund the second operable unit.

In 2002, Agere, Cytec, Ford, SPS and TI filed the present action against twenty-three defendants. When the bench trial in this matter commenced on June 23, 2008, only two defendants remained. After trial, one defendant settled, leaving Carpenter Technology Corporation (“Carpenter”) as the sole active defendant.

For the reasons set forth below, judgment is entered in favor of plaintiffs and against Carpenter on all counts. Judgment is entered in favor of Carpenter and against plaintiffs on Carpenter’s counter-claims for contribution.

II. Findings of Fact

Upon consideration of the Proposed Findings of Fact and Conclusion of Law (Doc. Nos 406, 407), the responses thereto, and the testimony, exhibits and arguments presented during the bench trial, the Court finds the following facts:

A. Background

Manfred DeRewal, Senior (“DeRewal Senior”) was born in 1927 (P-333, Dep. of Manfred T. DeRewal, Senior [hereinafter DeRewal, Sr. Dep.] 12:3-4) and he obtained a bachelor’s degree in chemistry from the University of Miami (DeRewal, Sr. Dep. 12:5-8). In the early 1960s, DeRewal Senior owned, operated and served as president of Echo, Incorporated, a pesticide manufacturing company located in Revere, Pennsylvania. (DeRewal, Sr. Dep. 15:22-16:23.) The corporation operated until 1967 when, as a consequence of its pollution practices, it was sold to Revere Chemical Corporation, (DeRewal, Sr. Dep. 17:9-18:2), a corporate entity operated by DeRewal Senior, and of which he also served as president (P-43; P-13, page 2).¹ Revere Chemical Company was also forced to cease operations as a result of industrial waste pollution practices. (P-45; P-13, page 2; See also Noll N.T. 21:16-23:9.)

On September 2, 1969, DeRewal Senior established Boarhead Corporation for the purpose of purchasing real estate which eventually came to be known as Boarhead Farms. (J-1; DeRewal, Sr. Dep. 18:11-19:9; J-33 ¶ 9, 10.) Boarhead Farms is located on Lonely Cottage Road in Upper Black Eddy, Pennsylvania. (J-33 ¶ 1; DeRewal, Sr. Dep. 19:10-13;) On December 29, 1969, DeRewal incorporated DeRewal Chemical Company, Inc. (“DCC”), whose business was to remove, transport and dispose of chemical waste generated by other companies. (J-3; J-33 ¶ 11; DeRewal, Sr. Dep. 20:24-21:12.) Manfred DeRewal, Senior was the sole owner of DCC and, as such, he controlled the day-to-day operations of the company. (DeRewal, Sr. Dep. 20:22-21:17.)

¹DeRewal Senior denied involvement with Revere Chemical Corporation (DeRewal, Sr. Dep. 18:8-10.) However, multiple documents identify him as the President of Revere Chemical Corporation. (See P-13, page 2; P-14; P-43.)

Initially, DCC disposed of the acquired waste solely at Boarhead Farms. (DeRewal, Jr. N.T. 22:17-23; 30:8-25; Bruce DeRewal N.T. 50:10-15; Barsum N.T. 73:3-22; Bean N.T. 107:5-11; Shaak N.T. 115:14-20; P-332, Stephens Dep. 28:14-24; 92:13-21; 98:15-22; 99:12-16; 170:16-171:11.) The disposal of industrial waste at Boarhead Farms continued, and in October 1973, a neighboring resident complained to the Bucks County Department of Health (“BCDOH”) that a stream which flowed near Boarhead Farms and onto his property was discolored and foamy. (P-9; P-13; Noll N.T. 23:10-19.) Peter Knoll, a field inspector for the BCDOH, inspected the stream, determined that it was polluted, and identified the source of the pollution as Boarhead Farms. (P-9; P-13; Noll N.T. 23:19-24:3.) The BCDOH notified the Pennsylvania Department of Environmental Resources (“DER”), and on November 2, 1973, DER issued an order to DeRewal Senior to neutralize pollutants on the property and to remove residual waste by November 9, 1973. (P-13, page 2.) DeRewal Senior failed to comply with this order. (*Id.*)

On December 1, 1973, DCC took possession of a rental property on Ontario Street in Philadelphia, Pennsylvania. (J-4.) The Ontario Street property consisted of a warehouse building with a floor drain, and was located two blocks from the Delaware River. (J-33 ¶ 63; DeRewal, Jr. N.T. 37:3-38:1.) DCC began disposing of waste solutions directly into the floor drain at the Ontario Street location. (DeRewal, Jr. N.T. 38:8-20.) The Philadelphia Water Department wrote to DeRewal Senior on September 24, 1974, about the disposal of improper waste into the city sewer system from the Ontario Street property. (J-33 ¶ 64.) On June 13, 1975, the Water Department plugged and sealed the lateral connection between the warehouse and the sewer system. (J-33 ¶ 66-67.)

Undeterred, DeRewal established another corporation, Environmental Chemical Control,

as a straw entity to rent yet another property to use as a waste disposal site for DCC. (J-5; DeRewal, Sr. Dep. 114:14-115:19; 116:20-117:19.) At this site, located in the Wissinoming Industrial Park in Philadelphia, Pennsylvania, (DeRewal, Sr. Dep. 114:19-24.), DCC disposed of waste directly down a storm drain which emptied into the Delaware River. (DeRewal, Jr. N.T. 40:7-20.) DCC eventually ceased use of this site as a result of concerns raised by the Philadelphia Water Department, Philadelphia Police Department and EPA. (DeRewal, Sr. Dep. 124:11-125-14.)

“Between February 20, 1973, and July 30, 1976, the Bucks County Department of Health filed in excess of fifteen Waste Discharge Inspection Reports regarding the Boarhead Farms Site.” (J-27.) The reports chronicled improperly stored chemicals, releases of liquid chemicals, sewage sludge dumping, and burial of drums. (J-27.) On March 26, 1976, DeRewal Senior and the Boarhead Corporation were found guilty of nine violations of the Pennsylvania Clean Streams Law. (J-27, AR400018.) On October 15, 1976, an injunction issued preventing DeRewal from bringing any chemicals to the Boarhead Farms site. (J-24, page 2-3.)

B. EPA Action at Boarhead Farms

In 1984, the EPA began its Preliminary Assessment and Site Investigation of Boarhead Farms. (J-24; J-25; J-33 ¶ 12.) The assessment and investigation confirmed the presence of a variety of contaminants (J-33 ¶ 12) and, based on this information, on March 31, 1989 EPA placed Boarhead Farms on the National Priorities List (J-33 ¶ 13; Vandeven N.T. 132:2-17). The EPA Remedial Investigation began on December 5, 1989, and found a multitude of hazardous substances present in the soils, sediments and groundwater at Boarhead Farms. (J-33 ¶ 14-16; Vandeven N.T. 137:21-138:11.) During the Remedial Investigation, EPA excavated and

removed in excess of 2,500 buried drums, excavated and removed buried tanks, removed contaminated soil, constructed a preliminary groundwater treatment system and installed treatment systems on sixteen residential wells. (Vandeven N.T. 155:24-156:17; Seibel N.T. 48:8-49:5.) Additionally, several drums of radioactive materials were excavated and removed by General Ceramics, Inc., the company which had produced the waste. (J-23, page 4, AR314513.)

After the Remedial Investigation, EPA conducted a Feasibility Study and issued a Proposed Remedial Action Plan in January 1998. (J-33 at ¶ 17-18.) Following notice and comment on the Proposed Remedial Action Plan, EPA issued a Record of Decision ("ROD") on November 18, 1998. (J-26; J-27; J-33 ¶ 19.) The ROD identified numerous chemicals of potential concern. (J-26, Table 7.) Specifically, nine chemicals of potential concern were identified as present in the surface soil,² fifty-three chemicals of concern in the shallow groundwater,³ four chemicals of concern in the pond sediments,⁴ and two chemicals of concern in the pond surface water.⁵ (J-26, Table 7; J-33 ¶ 20.)

²These include cadmium, chromium, arsenic, beryllium, copper, thallium, zinc, bis(2-ethylhexyl)phthalate, and n-Nitrosodipropylamine. (J-26, Table 7.)

³These include aluminum, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, manganese, nickel, silver, vanadium, thallium, zinc, benzene, bromodichloromethane, 2-butanene, carbon tetrachloride, chlorobenzene, chloroform, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethene, 1,2-dichloropropane, ethylbenzene, methylene chloride, methyl isobutyl ketone, 1,2,2,2-tetrachloroethane, tetrachloroethene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, vinyl chloride, xylenes, bis(2-chloroethyl)ether, 2,4-dichlorophenol, 2,4-dinitrophenol, 2-methylnaphthalene, 4-methylphenol, naphthalene, nitrobenzene, 2-nitrophenol, 1,2,4-trichlorobenzene, 2,4,6-trichlorophenol, BHC-alpha, BHC-delta, and heptachlor. (J-26, Table 7.)

⁴These include arsenic, beryllium, chromium, and nickel. (J-26, Table 7.)

⁵These include chromium and manganese. (J-26, Table 7.)

The ROD also set forth a remedial strategy for the Boarhead Farms Site. (J-26.) The strategy consisted of seven components: (1) soil aeration and treatment of volatile organic compound hot spots; (2) excavation and offsite disposal of buried drums; (3) groundwater extraction, metals precipitation, and air stripping; (4) installation of additional monitoring wells; (5) implementation of institutional controls and monitoring; (6) residential water treatment; and (7) phytoremediation. (J-26; J-33 ¶ 23.)

“Subsequent to the issuance of the ROD, EPA determined to implement the remedial action described in the ROD in two operable units.” (J-33 ¶ 23.) Operable Unit 1 (“OU-1”) addressed remedial components 3, 4, 5, 6, and 7 of the ROD and included groundwater extraction, metal precipitation, air stripping, installation of additional monitoring wells, implementation of institutional controls and monitoring for OU-1, residential water treatment, and phytoremediation. (J-33 ¶ 23; Seibel N.T. 60:3-7.) Operable Unit 2 (“OU-2”) addressed remedial components 1, 2, and 5 of the ROD and included soil aeration, treatment of volatile organic compound hot spots, excavation and disposal of drums, and implementation of institutional controls and monitoring for OU-2. (J-33 ¶ 23.)

C. Plaintiff's Settlements with EPA

Plaintiffs Cytec, Ford and SPS are signatories to an Administrative Order for Consent for Remedial Design, EPA Docket No. III-2000-002-DC, entered in February 2000, and a Consent Decree entered by this Court on September 28, 2000. (J-33 ¶ 24.) Pursuant to these agreements, Cytec, Ford and SPS agreed to perform the OU-1 work and to reimburse EPA for future OU-1 administrative and oversight costs. (J-33 ¶ 24.) Cytec, Ford, SPS, TI and Agere agreed to collectively fund the OU-1 remedial design and remedial action (“RD/RA”). (J-33 ¶ 25.) These

four entities then entered into an agreement with NRM and Worthington Steel Company-Malvern (“OU-1 Group”) to collectively fund and perform the OU-1 RD/RA. (J-33 ¶ 24.)

Plaintiffs Cytec, Ford, SPS and TI are signatories to an Administrative Order for Consent for Remedial Design, EPA Docket No. III-2001-0010-DC, effective October 17, 2001, and a Consent Decree entered by this Court on March 14, 2002. (J-33 ¶ 40.) Pursuant to these agreements, Cytec, Ford, SPS and TI agreed to perform the OU-2 RD/RA work, to reimburse EPA for \$7,000,000 in response costs incurred and accounted for prior to July 2000, to reimburse EPA for response costs incurred after July 2000 but not yet accounted for, and to reimburse EPA for its future costs related to OU-2. (J-33 ¶ 40.) Thereafter, Cytec, Ford, SPS, TI, and Agree (“OU-2 Group”) entered into an agreement to collectively fund and perform the OU-2 RD/RA. (J-33 ¶ 41.)

D. OU-1 Remediation

The OU-1 group hired de maximis, inc. as the supervising contractor of the OU-1 work. (J-33 ¶ 28; Seibel N.T. 43:7-45:2.) Geoffrey Seibel, a remedial project coordinator for de maximis, served as the project coordinator for the OU-1 work. (Seibel N.T. 43:9-45:2.) The OU-1 Group assumed responsibility for maintenance and operation of the groundwater extraction and treatment system on May 2, 2000. (J-33 ¶ 31.) At that time, the groundwater extraction and treatment system, constructed by EPA, consisted of a 1,000 foot long trench to collect groundwater. (Seibel N.T. 52:20-53:6.) The trench contained pumps which conveyed the groundwater to a treatment building, where the water was passed through an air stripper. (Seibel N.T. 53:6-54:5.) The air stripper bubbled air through the water, causing the volatile organic compounds to exit the water into the air. (Seibel N.T. 54:6-11.) The volatile organic compounds

were then vented into the air outside the building. (Seibel N.T. 54:10-16.) The groundwater extraction and treatment system did not remove inorganics or metals. (Seibel N.T. 54:24-1, 64:17-20.)

Because the third component of the ROD required precipitation of metals, the OU-1 Group retained Bigler and Associates, Inc., to reconstruct the preliminary groundwater treatment system in order to accomplish this task. (J-26; Seibel N.T. 64:15-23; 68:1-6; J-33 ¶ 32.) A proposed modification was submitted to, and approved by, EPA. (Seibel N.T. 68:17-70:12; J-33 ¶ 32.) In 2001 and 2002, a comprehensive groundwater treatment plant was implemented at the Site. (Seibel N.T. 71:23-72:15; J-33 ¶ 32.) In the new treatment system, the groundwater from the trench is pumped into a tank, which contains an air stripper and removes volatile organic compounds in much the same manner as the previous system. (Seibel N.T. 71:23-73:6; J-33 ¶ 32.) One major difference, however, is that the volatile organic compounds are now filtered from the air, as opposed to externally vented. (Seibel N.T. 73:1-6; J-33 ¶ 32.) Another difference is that the modified system removes metals. (Seibel N.T. 73:7-74:1; J-33 ¶ 32.) First, the holding tank allows some of the iron in the water to precipitate out. (Seibel N.T. 73:7-13; J-33 ¶ 32.) The water then flows from the tank to a metals treatment unit, where the remaining metals, except for manganese, are removed. (Seibel N.T. 73:21-74:1; J-33 ¶ 32.) The metals form a sludge, which is captured and taken to an EPA-approved disposal facility. (Seibel N.T. 73:21-74:4; J-33 ¶ 32.) The manganese is then removed by a special filter, and the water is discharged out of the treatment plant. (Seibel N.T. 74:6-14; J-33 ¶ 32.)

Bigler and Associates was also hired by the OU-1 Group, beginning in December 2001, to continue operation and maintenance of the groundwater treatment plant. (J-33 ¶ 33.) In May

2001, Bigler and Associates suggested conversion of the pneumatic pumps in the groundwater treatment system to electric pumps in order to decrease the system's maintenance costs.⁶ (J-33 ¶ 33.) This was approved by EPA and, between July and August 2001, the pneumatic pumps were replaced with electric pumps. (J-33 ¶ 34.)

The OU-1 Group also continues monitoring the Site, as required by the ROD. A contractor was hired to monitor and maintain the residential well treatment units. (Seibel N.T. 84:4-15; J-33 ¶ 36.) Additionally, water from the monitoring wells at the Site is regularly sampled to determine whether the level of contaminants in the groundwater is decreasing. (Seibel N.T. 80:16-83:6; J-33 ¶ 37.) All of this work was approved by the EPA. (J-33 ¶¶ 36-37.)

Through its consultant Brown and Caldwell, the OU-1 Group conducted a study to determine whether phytoremediation, or the use of plants to remove contaminants from soil, would be effective in helping to clean up the Site. (Seibel N.T. 85:9-86:13; J-33 ¶ 38.) In reliance on Brown and Caldwell's study, the EPA determined that phytoremediation would not be effective. (Seibel N.T. 85:9-87:5; J-33 ¶ 38.)

The last requirement of OU-1, installation of institutional controls, was not immediately performed. Rather, EPA allowed the OU-1 institutional control requirements to be combined with the OU-2 institutional control requirements. (Seibel N.T. 83:21-84:1.)

E. OU-2 Remediation

The OU-2 Group hired Brown and Caldwell as the supervising contractor of the OU-2 work and Code Environmental Inc. to perform the OU-2 construction. (J-33 ¶¶ 43, 44.)

⁶The pneumatic, or air-driven, pumps caused the iron in the groundwater to clog pipes and rust equipment. (Seibel N.T. 78:24- 79:17.)

Likewise, de maximis and Mr. Seibel were retained as the project coordinators. (J-33 ¶ 28.)

In performing the OU-2 remediation, the first task for the OU-2 Group was to more accurately delineate the areas previously identified by the EPA as being volatile organic compound ("VOC") hot spots. (Seibel N.T. 89:8-20; 92:21-25.) The OU-2 Group determined that the VOC hot spots were actually much smaller in area than estimated by EPA. As such, it was determined that soil aeration and treatment of the VOC hot spots was not cost-effective. (Seibel N.T. 93:14-94:2.) Instead, the soil was excavated and removed for offsite disposal, as approved by the EPA. (Seibel N.T. 93:23-94:2; 91:9-13.)

Next, the OU-2 Group investigated the twenty-seven areas of the Site identified by EPA as presenting magnetic anomalies. (Seibel N.T. 92:4-8.; 95:10-18.) The magnetic study, which was performed by Brown and Caldwell, confirmed magnetic anomalies at some of the areas previously identified by the EPA and excluded others. (Seibel N.T. 95:10-13.) Code Environmental then excavated the confirmed areas to determine the source of the magnetic anomalies. (Seibel N.T. 95:19-96:7.) Scraps of metal objects, including water heaters, wire, fragments of drums, and crushed drums, were unearthed, removed and disposed. (Seibel N.T. 96:19-98:13.) Additionally, the OU-2 Group discovered drums buried beneath the garage at the Site. (Seibel N.T. 98:16-23.) This required the group to dismantle the garage, remove the concrete floor, and excavate and remove the drums. (Seibel N.T. 98:16-23.)

On November 10, 2003, the EPA issued a preliminary closeout report, (Seibel N.T. 99:25-100:15; J-20.), the type of document typically issued by EPA when remedial construction is complete. (Seibel N.T. 100:10-101:4.) The document does not indicate, however, that maintenance and monitoring are complete. (Seibel N.T. 101:2-3.) In this particular case, the

preliminary closeout report stated that the OU-1 and OU-2 remedy components were complete except for continued operation and maintenance of the groundwater extraction and treatment systems, continued maintenance of the residential filtration systems, possible modification of on-site phytoremediation and implementation of institutional controls. (J-20; Seibel N.T. 101:10-20.)

F. OU-1 and OU-2 Groups' Expenditures

The OU-1 Group established trust accounts into which OU-1 entities contribute, or have contributed, funds. (J-33 ¶ 26.) Costs related to the OU-1 work were paid from the OU-1 trust accounts. (J-33 ¶ 27.) Future costs related to the OU-1 Consent Decree will likewise be paid from the OU-1 trust accounts. (J-33 ¶ 27.) In a similar fashion, the OU-2 Group established and contributed funds to the OU-2 trust accounts. (J-33 ¶ 41.) The costs of activities carrying out the OU-2 RD/RA, and other requirements of the OU-2 Consent Decree, were paid from the OU-2 trust accounts. (J-33 ¶ 42.)

The bills from remediation consultants and contractors are reviewed by Seibel and Coslett of de maximis. (J-33 ¶ 50.) After reviewing the bills, they make recommendations to the OU-1 and OU-2 Groups regarding payment, and forward the bills to two members of the Technical Committee.⁷ (J-33 ¶¶ 50-51.) The two members of the Technical Committee review the bills and de maximis' recommendations and make a final determination with regard to payment. (J-33 ¶ 51.) If approved, a payment recommendation is forwarded to Timothy Bergere, an attorney at Montgomery, McCracken & Rhoads, and common counsel to the OU-1 and OU-2 Groups with

⁷The Technical Committee is comprised of representatives from the individual OU-1 and OU-2 entities. (J-33 ¶ 29.) The Technical Committee reviews and approves payments to contractors performing work at the Site. (J-33 ¶ 29.)

respect to the work performed at the Site. (J-33 ¶¶ 51-52.) Mr. Bergere reviews payment recommendations and, when appropriate, arranges for payments to be made from the OU-1 or OU-2 trust accounts. (J-33 ¶ 53.)

Plaintiffs have incurred \$13,678,378.55 in past costs as of December 31, 2007. (J-33 ¶¶ 55-59.) The costs break down as follows:

Cost Incurred	Agere	Cytec	Ford	SPS	TI	Total
OU-1 RD/RA	\$540,874.34	\$846,674.74	\$841,152.85	\$841,152.85	\$286,601.22	\$3,356,456.00
EPA Oversight for OU-1	\$64,439.21	\$67,080.45	\$67,080.45	\$67,080.45	\$22,360.15	\$288,040.71
OU-2 RD/RA	\$188,279.75	\$530,565.73	\$521,953.31	\$521,953.31	\$521,953.31	\$2,284,705.41
EPA Oversight for OU-2	\$25,428.64	\$75,359.08	\$75,064.54	\$75,064.54	\$75,064.54	\$325,981.34
EPA Past Costs	\$83,130.55	\$1,848,871.07	\$1,848,871.07	\$1,848,871.07	\$1,793,451.33	\$7,423,195.09
Total	\$902,152.49	\$3,368,551.07	\$3,354,122.22	\$3,354,122.22	\$2,699,430.55	\$13,678,378.55

The costs incurred by the OU-1 and OU-2 Groups were necessary to comply with the requirements of the ROD and were consistent with the National Contingency Plan. (J-33 ¶ 60.)

Cleanup at the Site must continue until the organic and inorganic contaminants in the groundwater reach an acceptable level as set forth by the EPA in the ROD. (J-26, page 34; Seibel N.T. 108:8-109:5.) As such, plaintiffs are incurring, and will continue to incur response costs for the indefinite future. (Seibel N.T. 108:8-109:17.)

G. TI Group Automotive Systems L.L.C.

EPA identified and notified Bundy Corporation that it was a potentially responsible party

with regard to the Boarhead Farms Site. (Guerriero N.T. 24:19-23.) Sometime later, in November 1999, Bundy Corporation amended its articles of incorporation to change its name to TI Group Automotive Systems Corporation. (P-154; Guerriero N.T. 23:8-21.) At this time, TI Group, PLC, a United Kingdom corporation, was the ultimate parent of TI Group Automotive Systems Corporation. (Guerriero N.T. 27:6-8.)

In December 2000, the parent company, TI Group, PLC, merged into Smith's Industries, PLC, another United Kingdom Corporation. (Guerriero N.T. 27:13-17.) The resulting entity was called Smith's Group PLC ("Smith's"), which became the ultimate parent of TI Group Automotive Systems Corporation. (Guerriero N.T. 27:13-17.) Smith's then agreed to sell TI Group Automotive Systems Corporation to 329th Shelf Investment Company Limited. (P-157; Guerriero 27:25-29:1.) As part of the agreement, Smith's agreed to indemnify TI Group Automotive Systems Corporation and 329th Shelf Investment Company from any liability arising out of the Boarhead Farms Site. (P-157; Guerriero N.T. 29:9-17.)

On June 8, 2001, TI Group Automotive Systems L.L.C. was incorporated as a Delaware limited liability company. (P-155.) On June 25, 2001, TI Group Automotive Systems Corporation was merged into TI Group Automotive Systems L.L.C. (P-156.)

Plaintiff TI Group Automotive Systems L.L.C. ("TI"), as a signatory to the October 17, 2001 Consent Decree and as a member of the OU-1 and OU-2 Groups, incurs obligations resulting from these agreements. (Guerriero N.T. 31:3-7.) These obligations are transmitted to Smith's which satisfies the debts in accordance with the indemnity agreement. (Guerriero N.T. 29:24-30:18; Orme N.T. 42:4-9.) Smith's caused its subsidiaries, Smiths Group Services Corporation and Smiths Group North America, Incorporated, to transfer funds to the OU-1 and

OU-2 trust accounts on behalf of TI and in accordance with the indemnity agreement. (Orme N.T. 40:9-43:4; 45:17-23.) In return, and pursuant to the indemnity agreement, TI agreed with Smith's to seek to recover and to repay all sums paid by Smith's on TI's behalf. (Guerriero N.T. 31:21-32:7; Orme N.T. 4:6-11.) In fact, TI transferred a portion of its settlement proceeds emanating from this litigation to Smith's on May 10, 2007. (Guerriero N.T. 32:14-36:3; Orme N.T. 45:24-47:5.) The remainder of the proceeds are held in a trust account for fees and costs associated with the present litigation. (Guerriero N.T. 32:14-33:23.)

TI has incurred, and will incur in the future, obligations resulting from the Boarhead Farms Site. (Guerriero N.T. 30:24-31:7.) Furthermore, TI, as a signatory to the Consent Decree and as a member of the OU-1 and OU-2 Groups, is primarily liable for obligations arising from those agreements. (Guerriero N.T. 30:24-31:7.)

H. Waste Disposal at Boarhead Farms.

Manfred F. DeRewal, Junior ("Freddie DeRewal") began working for his father as an employee of DCC in 1972. (DeRewal, Jr. N.T. 19:16-25; 22:14-16.) At the time he started working, his older brother Bruce DeRewal was already an employee of DCC. (DeRewal, Jr. N.T. 20:5-7.) With the exception of four months in early 1972,⁸ Bruce and Freddie worked continuously for DCC until April 1977. (DeRewal, Jr. 20:24-21:19.) John Barsum was also a DCC truck driver, and he began working for the company in 1969 or 1970. (Barsum N.T. 70:11-

⁸During this time period, Bruce and Freddie DeRewal worked for Ramos Steel in Easton, Pennsylvania. (DeRewal, Jr. N.T. 21:2-9.) Carpenter's defense focused on Bruce's hazy memory of the time period during which he worked for Ramos Steel. (Bruce DeRewal N.T. 63:3-64:8, 83:9-84:7, 85:6-87:2.) Freddie DeRewal's memory on this point was much clearer, particularly because he knew that he did not have a driver's license while he was working at Ramos Steel. (DeRewal, Jr. N.T. 21:11-19.) As such, the Court credits his testimony on this issue.

13; 71:14-19.) A short while later, around 1970 or 1971, June Stephens began driving a truck for DCC. (P-332, Stephens Dep. 86:20-87:13.) Ed Cypecki was also a DCC driver in the early 1970s, when Bruce DeRewal, Freddie DeRewal and John Bean were DCC truck drivers. (Bruce DeRewal N.T. 58:16-19; Bean N.T. 104:1-19; Shaak N.T. 110:2-5; DeRewal, Jr. N.T. 20:17-23.) Ed Cypecki was already a DCC truck driver at the time when Jeff Shaak began driving a truck for DCC. (Shaak N.T. 109:22-110:5.) Rich Minthorn began working as a truck driver for DCC sometime after Jeff Shaak in the early 1970s. (Bruce DeRewal 58:16-59:4; Bean N.T. 104:1-19; Shaak N.T. 110:6-10; DeRewal, Jr. N.T. 20:8-23.) Lastly, John Bean drove a truck on a part-time basis for DCC. (Bean N.T. 100:7-10.)

At all times, DCC predominantly disposed of its waste at a single location. (DeRewal, Jr. N.T. 22:17-23, 30:19-25, 36:12-20, 38:24-39:7; Barsum N.T. 72:25-73:2; Bruce DeRewal N.T. 50:10-19; Shaak N.T. 115:14-20; 118:6-9.) A change in location typically occurred after the government became aware of DCC's illegal dumping. (DeRewal, Jr. N.T. 56:19-58:4.)

1. January 1, 1972 through December 1, 1973 ("Pre-Ontario Period").

DCC received the following waste volumes from its customers during the Pre-Ontario Period (J-34, Supplemental Facts Stipulated by All Parties; P-329, Stipulation Between Plaintiffs and Handy & Harman Tube Company, Inc. ¶ 5; J-35 Stipulation Between Plaintiffs, Handy & Harman Tube Company, Inc., and Carpenter Technology Corporation):

Entity	Volume of Waste (gallons)
Ford	38,940
Cytec	0
SPS	21,991

TI	0
Agere	0
Techalloy	229,067
Flexible Circuits	33,798
Etched Circuits	16,905
Plymouth Tube Company	16,104
Novartis	0
U.S. Navy	0
Bostik	0
Simon Wrecking	0
Quickline	525
Ashland Chemical Company	0
Diaz Chemical Corporation	0
Unisys	3,465
Rohm and Haas	0
Thomas & Betts	0
Total	360,795

All of these wastes contained CERCLA hazardous substances. (J-35.)

a. Carpenter's Waste Hauled by DCC during the Pre-Ontario Period.

Carpenter's regular business practice was to meter the flow and record the volume of waste acid stored in the Carpenter waste tanks. (P-331, Adams Dep. 24:6-10.) The volume of waste deposited in the tanks was recorded in a daily log. (P-331, Adams Dep. 24:6-10.) Mr. Reger worked at Carpenter from January 1959 through 1985. (P-330, Reger Dep. 9:4-7.) Mr. Reger received the log sheets contemporaneously and accurately tracked the volume of waste acid and associated removal costs. (P-330, Reger Dep. 16:9-24; P-331, Adams Dep. 24:6-23;

26:8-11.) In accordance with these job duties, Mr. Reger created P-36 and P-37, which record the volumes of waste acid removed from Carpenter and associated costs. (P-330, Reger Dep. 14:5-25, 17:23-18:15; June 24, 2008 N.T. 6:16-7:7, 8:16-24.) P-36 and P-37 were created directly from the purchasing invoices provided by the purchasing department for the purpose of monitoring waste volumes and disposal costs. (P-330, Reger Dep. 16:9-18:15.) These charts were created and maintained in the regular course of Carpenter's business. (P-330, Reger Dep. 17:23-18:15.)

Richard Cheri worked for Carpenter from 1956 until April 1, 1999. (Cheri N.T. 104:1-4.) In 1969 Cheri was assigned to Carpenter's Purchasing Department and one of his job duties was to select and hire acid waste removal companies. (Cheri N.T. 104:5-105:18.) Carpenter used blanket purchase orders to cover DeRewal's waste hauling services, (Cheri N.T. 108:15-109:18; P-35.) , and tracked and recorded the purchases on contemporaneously created documents. (Cheri N.T. 111:5-21.) Cheri created P-38, which recorded the volume of Carpenter waste acid removed by DCC, and the related costs, in accordance with his regular job duties. (Cheri N.T. 111:9-112:113:23.)

This Court finds as a fact that the Carpenter's contemporaneous business records accurately chronicle the volume of acid waste transferred to DCC. (P-36, P-37, and P-38.)

DCC obtained the following waste from Carpenter Technology during the pre-Ontario Period: during the month of June 1973, DCC hauled 143,850 gallons of waste at \$0.04/gallon for a cost of \$5,754.00. (P-36, Waste Acid Removal Cost; P-37, DeRewal Chemical Co. Waste

Acid Removal.⁹⁾ In July 1973, DCC hauled 188,100 gallons of waste at \$0.04/gallon for a cost

⁹⁾The photocopies of certain of the documents are difficult to decipher. However, by cross-referencing the gallons and cost on P-36, P-37, and P-38, all numbers can be discerned. The following charts summarize the relevant information in P-36, P-37, and P-38 regarding waste acid removed from Carpenter by DCC.

P-36, Waste Acid Removal Cost (DeRewal columns):

Month	Gallons	Cost
June 1973	143,850	\$5,754.00 (\$0.04/gallon)
July 1973	188,100	\$7,524.00
August 1973	95,700	\$3,828.00
September 1973	205,950	\$8,238.00
October 1973	188,164	\$7,526.56
November 1973	95,450	\$3,818.00
December 1973	113,058	\$4,462.00
Total	1,030,272	\$41,150.56
January 1974	49,800	\$1,992.00
February 1974	190,900	\$7,636.00
March 1974	161,850	\$8,092.50 (\$0.05/gallon)
April 1974	206,550	\$10,327.50

P-37, DeRewal Chemical Co. Waste Acid Removal:

Month	Gallons	Cost	Month Reported on Responsibility Sheet
6/13	4,350 (Summation of gallons written in margin as 30,450)	\$1,218.00	June
"	4,350		
6/14	4,350		
"	4,350		
"	4,350		
6/15	4,350		

"	4,350		
6/16 -	113,400	\$4,536	July [incorrectly states July, reported in June on P-36]
7/1-7/15	92,400	\$3,696	July
[indiscernible]	95,700	\$3,828	August [incorrectly states August, reported in July on P-36]
[indiscernible]	95,700	\$3,828	Sept. [incorrectly states Sept., reported in August on P-36]
[indiscernible]	100,050	\$4,002	Sept.
[indiscernible]	105,900	\$4,236	Oct. [incorrectly states Oct., reported in Sept. on P-36]
[indiscernible]	96,599	\$3863.96	Oct.
[indiscernible]	91,565	\$3,662.60	Nov. [incorrectly states Nov., reported in Oct. on P-36]
11/1-11/16	41,500	\$1,660.00	Nov.
11/17-11/30	53,950	\$2,158.00	Dec. [incorrectly states Dec., reported in Nov. on P-36]
12/2-12/14	58,100	\$2,324.00	Jan. [incorrectly states Jan., reported in Dec. on P-36]
[indiscernible]	54,958	\$2,198.32	Jan. [incorrectly states Jan., reported in Dec. on P-36]
1/1/74-1/15	29,050	\$1,162.00	Jan.
[indiscernible]	20,750	\$830.00	Feb. [incorrectly states Feb., reported in Jan. on P-36]
2/1-2/15	95,450	\$3,818.00	Feb.
2/16-2/28	95,450	\$3,818.00	Mar. [incorrectly states Mar., reported in Feb. on P-36]
3/1-3/15	83,000	\$4,150.00	Mar. Price increased to .05/gal.

of \$7,524.00. (P-36, P-37.) In August 1973, DCC hauled 95,700 gallons of waste at \$0.04/gallon for a cost of \$3,828.00. (P-36, P-37.) In September 1973, DCC hauled 205,950 gallons of waste at \$0.04/gallon for a cost of \$8,238.00. (P-36, P-37.) In October 1973, DCC hauled 188,164 gallons of waste at \$0.04/gallon for a cost of \$7,526.56. (P-36, P-37.) In November 1973, DCC hauled 95,450 gallons of waste at \$0.04/gallon for a cost of \$3,818.00.

The total volume of Carpenter waste hauled by DCC during the pre-Ontario Period was 917,214 gallons at \$0.04/gallon for a cost of \$36,688.56. Thus, the total volume of waste picked

3/18-3/31	78,850	\$3,942.50	Apr. [incorrectly states Apr., reported in Mar. on P-36]
4/1-4/15	103,750	\$5,187.50	Apr.
4/16-4/30	102,800	\$5,140.00	May [incorrectly states May, reported in Apr. on P-36]
5/1-5/15	94,500	\$4,725.00	

P-38, DeRewal Chemical Co.:

Inv. Date	Coverage Period	Amount	Gals.
1/20/74	1/1/74 thru 1/15/74	\$1,162.00	29,050
2/5/74	1/15/74 " 1/30/74	830.00	20,750
2/15/74	2/1/74 " 2/15/74	3818.00	95,450
2/28/74	2/16/74 " 2/28/74	3818.00	95,450
3/15/74	3/1/74 " 3/15/74	4150.00	83,000
3/31/74	3/16/74 " 3/31/74	3942.50	78,850
4/15/74	4/1/74 " 4/15/74	5187.50	103,750
4/30/74	4/16/74 " 4/30/74	5140.00	102,800
5/30/74	5/1/74 " 5/30/74	4725.00	94,500

up by DCC during the pre-Ontario Period was 1,278,009 gallons.¹⁰

b. Amount of Waste Disposed of at the Boarhead Farms Site During the Pre-Ontario Period.

From DCC's incorporation until December 1, 1973, when DCC obtained the Ontario Street location, its primary disposal site was Boarhead Farms. (DeRewal, Jr. N.T. 22:17-23; 30:8-25; Bruce DeRewal N.T. 50:10-15; Barsum N.T. 73:3-22; Bean N.T. 107:5-11; Shaak N.T. 115:14-20; P-332, Stephens Dep. 28:14-24; 92:13-21; 98:15-22; 99:12-16; 170:16-171:11.) During this time period, identified by the parties as the Pre-Ontario Period, DCC disposed of nearly all of its acquired waste at Boarhead Farms. (DeRewal, Jr. N.T. 22:17-23; 30:8-25; Bruce DeRewal N.T. 50:10-15; Barsum N.T. 73:3-22; Bean N.T. 107:5-11; Shaak N.T. 115:14-20; P-332, Stephens Dep. 28:14-24; 92:13-21; 98:15-22; 99:12-16; 170:16-171:11.) All of DCC's truck drivers unequivocally testified that during the Pre-Ontario Period, they took the overwhelming bulk of DCC customers wastes to Boarhead Farms. Freddie DeRewal took all but three tankers of DCC's customers' bulk wastes to the Site during the Pre-Ontario Period. (DeRewal, Jr. N.T. 22:17-23; 30:8-25.) When Bruce DeRewal first began working for his father, he took all of the waste he picked up back to the Boarhead Farms Site. (Bruce DeRewal N.T. 50:10-15.) John Barsum took all but four or five loads of bulk waste to Boarhead Farms during the Pre-Ontario Period. (Barsum N.T. 73:3-22.) Barsum further testified that prior to the Ontario Street location opening, almost all of the waste hauled by DCC was transported to Boarhead Farms. (Barsum N.T. 72:25-2.) John Bean hauled every load of bulk waste he

¹⁰Derived by adding 360,795 gallons from plaintiffs and settled entities (excluding Handy & Harman Tube Company, whose waste will be factored in later) plus 917,214 gallons from Carpenter.

obtained from customers to Boarhead Farms. (Bean N.T. 107:5-11.) Jeffrey Shaak worked for DCC as a truck driver during two different time periods. (Shaak N.T. 111:1-7.) During the initial period of employment, he transported all customer waste to Boarhead Farms. (Shaak N.T. 115:14-20.) Finally, the waste hauled by June Stephens during the Pre-Ontario Period was disposed at the Boarhead Farms.¹¹ (P-332, Stephens Dep. 28:14-24; 92:13-21; 98:15-22; 99:12-16; 170:16-171:11.)

In summary, during the Pre-Ontario Period, DCC drivers hauled all but 7 or 8 tankers of waste to the Boarhead Farms for disposal. (DeRewal, Jr. N.T. 22:17-23; 30:8-25; Barsum N.T. 73:3-22.) Each tanker truck held approximately 4,000 gallons of waste. (DeRewal, Jr. N.T. 31:1-12; Mann N.T. 59:12-18; P-34, Contract between DCC and Carpenter, ¶ 2; See also P-42, page 1 (stating that two truckloads contained approximately 8,000 gallons).) As such, all but approximately 28,000 to 32,000 gallons of waste hauled by DCC during the Pre-Ontario Period was disposed at Boarhead Farms. The total volume of waste hauled by DCC during the Pre-Ontario Period was 1,278,009 gallons. Of this, at most 32,000 gallons were disposed of elsewhere. Therefore, at least 97.5% of the waste hauled by DCC during the Pre-Ontario Period was disposed of at Boarhead Farms.¹²

Applying this percentage, the Court finds that of the 1,278,009 gallons of waste hauled

¹¹June Stephens testified that with the exception of six tankers, all of the waste she hauled for DCC was transported to Boarhead Farms. (P-332, Stephens Dep. 28:14-24; 92:13-21; 98:15-22; 99:12-16; 170:16-171:11.) Ms. Stephens stated that on six occasions, at most, she took waste to either the Ontario Street location or the Wissinoming Industrial Park location. (P-332, Stephens Dep. 28:14-24.) Because these sites were not obtained by DCC until after December 1, 1973 (J-33 ¶¶ 62, 63, 68, 69), we find as a fact that all of the pre-Ontario period waste hauled by June Stephens was disposed at Boarhead Farms.

¹² $(1,278,009 - 32,000) / 1,278,009 = 0.975 = 97.5\%$.

from plaintiffs, settled entities¹³ and Carpenter by DCC during the Pre-Ontario Period, 1,246,059 gallons were disposed at the Boarhead Farms. Additionally, Handy & Harman Tube Company stipulated that 8,158 gallons of its waste was disposed at Boarhead Farms. (P-329, Stipulation Between Plaintiffs and Handy & Harman Tube Company, Inc. ¶¶ 1-4.) As such, the total volume of waste disposed at the Boarhead Farms Site from all entities during the Pre-Ontario Period was 1,254,217 gallons.

Because 97.5% of all waste hauled by DCC during the Pre-Ontario Period was disposed at Boarhead Farms, the following volumes of waste are attributable to plaintiffs, settled entities and Carpenter for this time period:

Entity	Volume of Waste Disposed of at Site during Pre-Ontario Period (gallons)
Carpenter	894,284 ¹⁴
Ford	37,967
Cytec	0
SPS	21,441
TI	0
Agere	0
Techalloy	223,340
Flexible Circuits	32,953
Etched Circuits	16,482
Plymouth Tube Company	15,701
Novartis	0

¹³With the exception of Handy & Harman Tube Company.

¹⁴ $0.975 \times 917,214 \text{ gallons} = 894,284 \text{ gallons}$

U.S. Navy	0
Bostik	0
Simon Wrecking	0
Quickline	512
Ashland Chemical Company	0
Diaz Chemical Corporation	0
Unisys	3,378
Rohm and Haas	0
Thomas & Betts	0
NRM	0
Handy & Harman	8,158
Total	1,254,217

2. December 1, 1973 through June 30, 1975 ("Ontario Period").

DCC acquired the following volumes of customer waste during the Ontario Period (J-34, Supplemental Facts Stipulated by All Parties; P-329, Stipulation Between Plaintiffs and Handy & Harman Tube Company, Inc. ¶ 5; J-35 Stipulation Between Plaintiffs, Handy & Harman Tube Company, Inc., and Carpenter Technology Corporation):

Entity	Volume of Waste (gallons)
Ford	0
Cytec	193,000
SPS	24,475
TI	0
Agere	0
Techalloy	0
Flexible Circuits	100,056

Etched Circuits	23,213
Plymouth Tube Company	11,667
Novartis	0
U.S. Navy	0
Bostik	0
Simon Wrecking	0
Quickline	2,261
Ashland Chemical Company	0
Diaz Chemical Corporation	0
Unisys	0
Rohm and Haas	0
Thomas & Betts	0
Total	354,672

All waste contained CERCLA hazardous substances. (J-35.)

a. Carpenter's Waste Hauled by DCC during the Ontario Period.

DCC received the following Carpenter waste during the Ontario period: During the month December 1973, DCC hauled 113,058 gallons of waste at \$0.04/gallon for a cost of \$4,462. (P-36, P-37.) During the month of January 1974, DCC hauled 49,800 gallons of waste at \$0.04/gallon for a cost of \$1,992.00. (P-36, P-37, P-38.) During the month of February 1974, DCC hauled 190,900 gallons of waste at \$0.04/gallon for a cost of \$7,636.00. (P-36, P-37, P-38.) In March 1974, DCC hauled 161,850 gallons of waste at \$0.05/gallon for a cost of \$8,092.50. (P-36, P-37, P-38.) In April 1974, DCC hauled 206,550 gallons of waste at \$0.05/gallon for a cost of \$10,327.50. (P-36, P-37, P-38.) In May 1974, DCC hauled 94,500 gallons of waste at \$0.05/gallon for a cost of \$4,725.00. (P-37, P-38.)

Thus, the total volume of Carpenter waste hauled by DCC during the Ontario period was 816,658 gallons.

b. Amount of Waste Disposed of at the Boarhead Farms Site During the Ontario Period.

On November 5, 1973, DeRewal leased a one-story warehouse on Ontario Street in Philadelphia. (J-33 ¶ 62, 63.) DCC took possession of the Ontario Street property on December 1, 1973 (J-33 ¶ 62), and disposed of waste at the Ontario Street location by dumping it directly down the sewer (J-33 ¶¶ 64-67; DeRewal, Jr. N.T. 37:3-39:3). The Water Department wrote to DeRewal on September 24, 1974, directing him to install a limestone interceptor and a two compartment oil interceptor at the facility to prevent waste discharges into the city sewer system. (J-33 ¶ 64.) The Water Department wrote to DeRewal again on June 2, 1975, identifying multiple deficiencies in DCC's handling of waste, and informed DCC that it planned to terminate the sewer and water services at the Ontario Street location. (J-33 ¶ 65.) On June 2, 1975 and June 13, 1975, the Water Department plugged the lateral connection between the Ontario Street location and the city sewer system. (J-33 ¶ 66.) On June 13, 1975, the Water Department severed and sealed the lateral connection. (J-33 ¶ 67.)

Beginning on December 1, 1973, when DCC took possession of the Ontario Street location, and ending on June 30, 1975, shortly after the Philadelphia Water Department severed and sealed the sewer connection, DCC primarily disposed of waste at the facility on Ontario Street. (J-33 ¶¶ 62-67; DeRewal, Jr. 63:22-64:1.) However, DCC also disposed of some of its acquired waste at Boarhead Farms during the Ontario Period. June Stephens worked for DeRewal during the Ontario Period (Stephens Dep. 85:9-88:10) and, with the exception of four to six tankers, she took all of the waste she hauled to the Boarhead Farms Site. (Stephens Dep.

28:14-24; 92:16-21; 98:18-22; 99:12-16.) Additionally, John Bean worked for DCC during the Ontario Street period (Bean N.T. 101:17-102:2) and all of the waste he hauled went to the Boarhead Farms Site. (Bean N.T. 105:23-106:2; 106:24-11.)

Moreover, observations by the Bucks County Department of Health ("BCDOH") indicate that waste was being disposed at Boarhead Farms during the Ontario Period. On April 25, 1974, the BCDOH observed a discharge of waste from the Boarhead Farms Site which had caused a downstream creek to foam. (P-20.) Additionally, BCDOH observed heavy orange sediment downstream from the swamp on the Boarhead Farms property, and concluded that the swamp was untreated and saturated with waste. (P-20.) Lastly, BCDOH observed an unknown orange substance in a puddle near a storage area on the Site. (P-20.) On February 26, 1975, BCDOH observed that the collection pit on the Site was overflowing, and that there were breaches in the collection trench which allowed waste to flow toward the creek downstream from the Site. (P-22.) On this same day, BCDOH observed trailers containing barrels of acid and dry chemicals parked at the Site. (P-22.)

Lastly, during the Ontario period Bruce DeRewal drove between Ontario Street and Carpenter roughly four times per day, essentially living out of the truck. (Bruce DeRewal N.T. 56:13-24.) Once a week, however, Bruce DeRewal would take the tanker of Carpenter waste back to the farm for disposal so that he could get a change of clothes and money for fuel. (Bruce DeRewal N.T. 56:13-24.) During the Ontario Period, DCC hauled Carpenter's waste from December 1, 1973 through May 30, 1974. (P-36, P-37, P-38.) Because this time period consisted of 26 weeks, and Bruce DeRewal disposed of Carpenter's waste once a week at the Boarhead Farms Site, approximately 26 tankers of Carpenter's Ontario period waste was

disposed at Boarhead Farms. As a tanker holds 4,000 gallons of waste, (DeRewal, Jr. N.T. 31:1-12; Mann N.T. 59:12-18; P-34, Contract between DCC and Carpenter, ¶ 2; See also P-42, page 1 (stating that two truckloads was approximately 8,000 gallons).), during the Ontario period, 104,000 gallons of the 816,658 gallons of Carpenter's waste hauled by DCC was transported to Boarhead Farms.¹⁵ In other words, approximately 13% of Carpenter's waste was disposed at Boarhead Farms.¹⁶

Although the evidence only specifically identifies Carpenter waste as having been disposed at Boarhead Farms during the Ontario period, it is reasonable to conclude from the observations of the BCDOH employees that other waste was also being disposed at Boarhead Farms during this period. (See P-20; P-22 (observing orange sediment, orange puddle, and waste contained in drums at the Site during the Ontario Period).) As a result, it is fair to conclude that Carpenter waste was not treated differently than the waste of other DCC customers. Accordingly, we find that 13% of all waste hauled by DCC during the Ontario period was disposed at Boarhead Farms. Thus, of the 354,672 gallons of waste DCC picked up from the plaintiffs and settled parties during the Ontario period, thirteen percent, or 46,107 gallons, of this waste was disposed at Boarhead Farms Site. Therefore, the total volume of waste disposed at Boarhead Farms from plaintiffs, settled parties and Carpenter was 150,107 gallons.¹⁷

Because 13% of all waste hauled by DCC during the Ontario Period was disposed at

¹⁵4,000 gallons x 26 weeks = 104,000 gallons during the 26 week period.

¹⁶104,000 gallons/816,658 gallons = 13%

¹⁷104,000 gallons of Carpenter's waste + 46,107 gallons of plaintiffs' and settled parties' waste = 150,107 gallons.

Boarhead Farms, the following volumes of waste are attributable to plaintiffs, settled entities, and Carpenter for this time period:

Entity	Volume of Waste Disposed of at Site During Ontario Period (gallons)
Carpenter	104,000
Ford	0
Cytec	25,090
SPS	3,182
TI	0
Agere	0
Techalloy	0
Flexible Circuits	13,007
Etched Circuits	3,018
Plymouth Tube Company	1,517
Novartis	0
U.S. Navy	0
Bostik	0
Simon Wrecking	0
Quickline	2,261
Ashland Chemical Company	0
Diaz Chemical Corporation	0
Unisys	0
Rohm and Haas	0
Thomas & Betts	0
NRM	0

Handy & Harman	0
Total	150,107

3. July 1, 1975 through September 1, 1975 ("Gap Period")

For a two month period after the Water Department disconnected the Ontario Street location from the sewer system, DCC lacked regular access to a disposal location other than Boarhead Farms. (DeRewal, Jr. 57:17-58:8.) The parties stipulated to the volumes of waste picked up by DCC from July 1, 1975 through June 6, 1976, an eleven month period. (J-34.) The Court concludes that the volume of waste picked up by DCC over this eleven month period was constant and that a monthly average is reliable. The volumes of waste picked up by DCC from plaintiffs and the settled parties during the Gap Period are calculated by taking the monthly average from the stipulated volumes of waste hauled by DCC between July 1, 1975 and June 1, 1976 and then multiplying the average by two.

DCC picked up the following volumes of waste from plaintiffs and settled parties during the Gap Period (J-34, Supplemental Facts Stipulated by All Parties; P-329, Stipulation Between Plaintiffs and Handy & Harman Tube Company, Inc. ¶ 5; J-35 Stipulation Between Plaintiffs, Handy & Harman Tube Company, Inc., and Carpenter Technology Corporation):

Entity	Volume of Waste 7/1/75 - 6/1/76 (gallons)	Monthly Average	Volume of Waste Hauled by DCC during Gap Period
Ford	0	0	0
Cytec	0	0	0
SPS	12,540	1,140	2,280
TI	0	0	0
Agere	0	0	0

Techalloy	0	0	0
Flexible Circuits	15,792	1,436	2,871
Etched Circuits	13,885	1,262	2,525
Plymouth Tube Company	4,465	406	812
Novartis	0	0	0
U.S. Navy	0	0	0
Bostik	0	0	0
Simon Wrecking	0	0	0
Quickline	0	0	0
Ashland Chemical Company	0	0	0
Diaz Chemical Corporation	0	0	0
Unisys	0	0	0
Rohm and Haas	0	0	0
Thomas & Betts	0	0	0
Total	46,682	4,244	8,488

All wastes contained CERCLA hazardous substances. (J-35.)

During the Gap Period, Freddie DeRewal transported almost all of the waste he acquired from DCC customers to Boarhead Farms. (DeRewal, Jr. N.T. 38:24-39:7.) June Stephens worked for DeRewal during the Gap Period (Stephens Dep. 85:9-88:10) and all of the waste she hauled during the Gap Period went to Boarhead Farms.¹⁸ (Stephens Dep. 28:14-24; 92:16-21;

¹⁸The four to six tankers of waste June Stephens took to Philadelphia went to the Ontario or Wissinoming facilities. (Stephens Dep. 28:14-24; 92:16-21; 98:18-22; 99:12-16.) Neither of these locations were available during the Gap Period, and therefore all of the waste June Stephens hauled during this period went to Boarhead Farms.

98:18-22; 99:12-16.) Additionally, John Bean worked for DCC during the Gap Period (Bean N.T. 101:17-102:2) and all of the waste he hauled was transported to Boarhead Farms. (Bean N.T. 105:23-106:2; 106:24-11.)

From the drivers' testimony, the Court concludes that 100% of the waste picked up by DCC from its customers during the Gap Period was disposed at Boarhead Farms.¹⁹ Thus, all of the 8,488 gallons of customer waste received by DCC during this period was disposed at the Site.

In addition, DCC also hauled NRM waste during the Gap Period. (DeRewal, Jr. N.T. 41:11-25.) Freddie DeRewal took six to ten tankers of NRM waste to the Boarhead Farms Site during the Gap Period. (DeRewal, Jr. N.T. 42:4-7.) As a tanker truck held approximately 4,000 gallons of waste, (DeRewal, Jr. N.T. 31:1-12; Mann N.T. 59:12-18; P-34, Contract between DCC and Carpenter, ¶ 2; See also P-42, page 1 (stating that two truckloads was approximately 8,000 gallons).), DCC disposed of between 24,000 and 40,000 gallons of NRM waste at the Site during the Gap Period. The Court finds that DCC disposed of 32,000 gallons of NRM waste at the Site during the Gap Period.

Thus the total volume of waste DCC disposed at the Boarhead Farms Site during the Gap Period was 40,488 gallons.²⁰ Because 100% of all waste hauled by DCC during the Gap Period was disposed at Boarhead Farms, the following volumes of waste are attributable to plaintiffs,

¹⁹Although it is likely that, during the Gap Period, DCC disposed of some waste at locations other than Boarhead Farms, there is no specific evidence of any particular party's waste or any specific volume of waste going elsewhere. Moreover, the drivers testimony supports the inference that nearly all of the waste hauled by DCC during the two-month Gap Period went to Boarhead Farms. Because it is most fair to Carpenter, Court concludes that 100% of the waste hauled during the Gap Period went to Boarhead Farms, and rejects plaintiffs' proposed finding that 65% of the waste hauled by DCC during this period went to the Site.

²⁰8,488 gallons (plaintiffs and settled parties) + 32,000 gallons (NRM) = 40,488 gallons

settled entities and Carpenter for this time period:

Entity	Volume of Waste Disposed of at Site During Gap Period (gallons)
Carpenter	0
Ford	0
Cytec	0
SPS	2,280
TI	0
Agere	0
Techalloy	0
Flexible Circuits	2,871
Etched Circuits	2,525
Plymouth Tube Company	812
Novartis	0
U.S. Navy	0
Bostik	0
Simon Wrecking	0
Quickline	0
Ashland Chemical Company	0
Diaz Chemical Corporation	0
Unisys	0
Rohm and Haas	0
NRM	32,000
Handy & Harman	0
Thomas & Betts	0
Total	40,488

4. September 1, 1975 through March 29, 1977 (“Wissinoming Period”).

On October 18, 1976, Manfred DeRewal, Senior incorporated Environmental Chemical Control (“ECC”). (J-5; J-33 ¶ 68.) ECC entered into a lease dated May 6, 1976, with Wissinoming Industrial Park for the premises located on Comly Street in Philadelphia. Although the term of the lease ran from June 1, 1976 through May 31, 1977 (J-33 ¶ 69), DCC obtained access to the Wissinoming facility several months earlier, on approximately September 1, 1975 (DeRewal, Jr. N.T. 39:1-3, 58:1-8). Freddie DeRewal testified that, about two months after the Ontario Street facility was shut down, DCC began disposing of waste at the Wissinoming Industrial Park facility. (DeRewal, Jr. N.T. 58:1-8.) At the Wissinoming facility, DCC disposed of customer waste by dumping it down a drain, which emptied into the Delaware River. (DeRewal, Jr. N.T. 40:7-20.)

The parties stipulated to the volumes of waste picked up by DCC from July 1, 1975, through June 6, 1976, an eleven month period spanning both the Gap Period and part of the Wissinoming Period. (J-34.) The Court finds that the volume of waste picked up by DCC over this eleven month period was constant and that a monthly average is reliable. The volumes of waste picked up by DCC from plaintiffs and settled parties during the Wissinoming Period are calculated by taking the monthly average of the stipulated volumes hauled by DCC between July 1, 1975, and June 1, 1976, multiplying it by nine, and then adding the stipulated volume of waste hauled by DCC between June 1, 1976, and March 30, 1977.

DCC picked up the following volumes of waste from plaintiffs and settled parties during the Wissinoming Period (J-34, Supplemental Facts Stipulated by All Parties; P-329, Stipulation Between Plaintiffs and Handy & Harman Tube Company, Inc. ¶ 5; J-35 Stipulation Between

Plaintiffs, Handy & Harman Tube Company, Inc., and Carpenter Technology Corporation):

Entity	Volume of Waste 7/1/75 - 6/1/76 (gallons)	Monthly Average	Volume of Waste 9/1/75 - 6/1/76	Volume of Waste 6/1/76 - 3/30/77	Volume of Waste 9/1/75 - 3/30/77
Ford	0	0	0	0	0
Cytec	0	0	0	116,000	116,000
SPS	12,540	1,140	10,260	12,431	22,691
TI	0	0	0	0	0
Agere	0	0	0	0	0
Techalloy	0	0	0	0	0
Flexible Circuits	15,792	1,436	12,921	8,458	21,379
Etched Circuits	13,885	1,262	11,360	14,268	25,628
Plymouth Tube Company	4,465	406	3,653	1,165	4,818
Novartis	0	0	0	53,800	53,800
U.S. Navy	0	0	0	0	0
Bostik	0	0	0	9,000	9,000
Simon Wrecking	0	0	0	0	0
Quickline	0	0	0	0	0
Ashland Chemical Company	0	0	0	555,655	555,655 ²¹

²¹In its Reply to Plaintiffs' Proposed Findings of Fact and Conclusions of Law (Doc. No. 407), Carpenter argues that plaintiffs' evidence of the volume of waste disposed at the Site by Ashland, Diaz, and NRM should be disregarded because this evidence conflicts with plaintiffs' answers to defendants' contention interrogatories. Initially, the Court notes that Carpenter stipulated to the volume of waste DCC received from these entities. (J-34.) Additionally, answers to interrogatories, while competent evidence, are not binding. Fidelity & Deposit Co. of Maryland v. Hudson United Bank, 653 F.2d 766, 777 (3d Cir. 1981). Lastly, Ashland and Diaz' shares are the same in both plaintiffs' proposed findings and interrogatory answers. The purported difference is that, although plaintiffs originally believed that they could prove 25% of the nitrating acid waste went to Boarhead Farms during the Wissinoming Period, at trial their

Diaz Chemical Corporation	0	0	0	173,100	173,100
Unisys	0	0	0	0	0
Rohm and Haas	0	0	0	0	0
Thomas & Betts	0	0	0	0	0
Total	46,682	4,244	38,194	943,877	982,071

All wastes contained CERCLA hazardous substances. (J-35.)

Additionally, although the parties did not stipulate to a volume of waste for NRM, Freddie DeRewal testified that all of the waste he picked up from NRM during the Wissinoming Period went to the Wissinoming facility. (DeRewal, Jr. N.T. 42:1-3.) Jeff Shaak also picked up waste from NRM. (Shaak N.T. 116:20-23.) He, as well, transported all NRM waste to the Wissinoming location. (Shaak N.T. 116:24-117:11.) There is no specific evidence that DCC transported a particular volume of NRM waste to Boarhead Farms during the Wissinoming period.

It has been established as a fact, however, that although most waste hauled by DCC went to the Wissinoming location during the Wissinoming Period, DCC still periodically used the Boarhead Farms Site for waste disposal. June Stephens, who worked as a DCC driver during the Wissinoming Period (Stephens Dep. 85:9-88:10), took all of the waste she hauled to the Boarhead Farms Site, with the exception of four to six tankers. (Stephens Dep. 28:14-24; 92:16-21; 98:18-22; 99:12-16.) Additionally, John Bean worked for DCC during the Wissinoming

evidence only demonstrated that 15% of the waste went to Boarhead Farms. As such, their proposed findings correlated to the evidence presented at trial. With respect to NRM's waste, again, plaintiffs conformed their proposed findings to the proofs actually offered at trial. For all of these reasons, Carpenter's argument regarding plaintiffs' answers to interrogatories is of no moment.

Period (Bean N.T. 101:17-103:18) and all of the waste he transported during this time period was disposed at the Boarhead Farms Site. (Bean N.T. 105:23-106:2; 106:24-11.)

In reliance on this testimony, we conclude that 15% of the waste hauled by DCC during the Wissinoming Period was disposed at the Boarhead Farms Site. Thus, of the 982,071 gallons of waste DCC picked up from its customers during the Wissinoming Period, 147,311 gallons were disposed of at the Site.

Because 15% of all waste hauled by DCC during the Wissinoming Period was disposed at Boarhead Farms, the following volumes of waste are attributable to plaintiffs, settled entities, and Carpenter for this time period:

Entity	Volume of Waste Disposed of at Site During Wissinoming Period (gallons)
Carpenter	0
Ford	0
Cytec	17,400
SPS	3,404
TI	0
Agere	0
Techalloy	0
Flexible Circuits	3,207
Etched Circuits	3,844
Plymouth Tube Company	723
Novartis	8,070
U.S. Navy	0
Bostik	1,350
Simon Wrecking	0

Quickline	0
Ashland Chemical Company	83,348
Diaz Chemical Corporation	25,965
Unisys	0
Rohm and Haas	0
Thomas & Betts	0
NRM	0
Handy & Harman	0
Total	147,311

5. Unknown Periods

DCC picked up 2,390 gallons of waste from the United States Navy during an unknown time period. (J-34.) DCC picked up 3,025 gallons of waste from Simon Wrecking during an unknown time period.²² (J-34.)

There is no evidence of when DCC received this waste or where it was disposed. However, in fairness to Carpenter, the Court concludes that this waste had the same likelihood of reaching the Site as any other waste. Therefore, based on the percentage of waste disposed of at Boarhead Farms during the Pre-Ontario, Ontario, Gap, and Wissinoming time periods (see Sections III.H.1 through III.H.4 supra), the Court infers that 47% of the waste hauled by DCC

²²DCC also picked up 36,500 gallons of waste from Knoll International, Inc. ("Knoll") during an unknown period. Because Knoll's share is orphaned, the volume of waste attributed to it will not be included in the calculation. (See Section III.B. infra.)

during an unknown time period was disposed of at the Boarhead Farms Site.²³

The waste disposed of at the Site, attributable to the United States Navy is 1,123 gallons. The waste disposed of at the Site, attributable to Simon Wrecking is 1,422 gallons. Thus, of the 5,415 gallons of waste picked up by DCC during an unknown time period, 2,545 gallons were disposed at Boarhead Farms.

I. Volumetric Shares of Carpenter, Plaintiffs, and Settled Parties.

The total amount of waste disposed of at the Site during all time periods, including unknown time periods, was 1,594,668 gallons.²⁴ Thus, Carpenter, plaintiffs and settled parties have the following volumetric shares:

Entity	Volume Disposed of at Site	Percentage
Carpenter	998,284	62.60%
Ford	37,967	2.38%
Cytec	42,490	2.66%
SPS	30,307	1.90%
TI	0	0.00%
Agere	0	0.00%

²³There is no record evidence that the waste disposed of during an “unknown” period was more or less likely have been hauled during any specific time period. Thus, the Court finds that the waste hauled by DCC during an “unknown” period was equally likely to have been picked up during the Pre-Ontario Period, Ontario Period, Gap Period, or Wisconsin Period. As such, the likelihood that waste hauled during an unknown period was disposed of at the Site is calculated as follows: $[(97.5\% \times 23 \text{ months}) + (13\% \times 19 \text{ months}) + (100\% \times 2 \text{ months}) + (15\% \times 19 \text{ months})] / 63 \text{ total months} = 47\%$

²⁴ $1,254,217 \text{ (Pre-Ontario Period)} + 150,107 \text{ (Ontario Period)} + 40,488 \text{ (Gap Period)} + 147,311 \text{ (Wisconsin Period)} + 2,545 \text{ (Unknown Periods)} = 1,594,668 \text{ gallons}$

Techalloy	223,340	14.01%
Flexible Circuits	52,038	3.26%
Etched Circuits	25,869	1.62%
Plymouth Tube Company	18,753	1.18%
Novartis	8,070	0.51%
U.S. Navy	1,123	0.07%
Bostik	1,350	0.08%
Simon Wrecking	1,422	0.09%
Quickline	806	0.05%
Ashland Chemical Company	83,348	5.23%
Diaz Chemical Corporation	25,965	1.63%
Unisys	3,378	0.21%
Rohm and Haas	0	0.00%
Thomas & Betts	0	0.00%
NRM	32,000	2.01%
Handy & Harman	8,158	0.51%
Total	1,594,668	100.00%

J. Other Disposal Sites

Virtually all of the customers' waste acquired by DCC was disposed at Boarhead Farms, Ontario Street and the Wissinoming facility. (DeRewal, Jr. N.T. 22:17-23, 30:8-25, 38:24-39:7, 58:1-8, 63:22-64:1; Bruce DeRewal N.T. 50:10-15; Barsum N.T. 73:3-22; Bean N.T. 105:23-106:2, 106:24-107:11; Shaak N.T. 115:14-20; P-332, Stephens Dep. 28:14-24, 92:13-21, 98:15-22, 99:12-16, 170:16-171:11.) Bruce DeRewal never took any DCC customer waste to any

location other than the Boarhead Farms Site, the Ontario Street location or the Wissinoming facility. (Bruce DeRewal N.T. 60:12-16.) Jeff Shaak never took DCC customer waste to any location other than the Site or Wissinoming. (Shaak N.T. 118:2-14.) John Bean never took any DCC customer waste to any location other than Boarhead Farms. (Bean N.T. 107:5-11.) June Stephens only ever took DCC customer wastes to Boarhead Farms, Ontario Street and the Wissinoming facility. (P-332, Stephens Dep. 24:1-29:5, 170:1-171:11.)

The Revere Chemical Site, operated by DeRewal Senior in the 1960s, was shut down by the Commonwealth of Pennsylvania, and Pennsylvania Department of Environmental Protection clean up efforts began in 1971. (Noll N.T. 21:19-22:12.) Beginning in 1971, Peter Noll, an employee of the Bucks County Department of Health inspected the Revere Chemical site once a month. (Noll N.T. 22:14-16.) Noll did not observe any evidence of waste disposal at the Revere Chemical site. (Noll N.T. 22:17-23:9.)

DCC never utilized a landfill in or near Reading, Pennsylvania to dispose of Carpenter waste. No DCC driver ever testified to utilizing such a landfill. (DeRewal, Jr. N.T. 34:7-12; 36:12-20; Bruce DeRewal N.T. 58:8-11; P-332, Stephens Dep. 98:15-19.) Manfred DeRewal's deposition testimony that some unidentified DCC customer waste was transported to a landfill on Route 322, is not accepted as credible. (DeRewal, Sr. Dep. 89:20-90:25, 295:296:8.)

K. Orphaned Parties

The following entities lack available assets and are financially unable to participate in the cleanup of the Site: Manfred T. DeRewal, Senior, Boarhead Corporation, DCC, Environmental Chemical Corporation, Diaz Chemical Corporation, Drake Chemicals, Inc., Enviratec, Inc., Globe Disposal Co., Inc., Haven Chemical, Inc., Merit Metal Product Corporation, Sitkin

Smelting & Refining, Inc., and Trace International, Inc. (Dovell N.T. 148:2-166:23.)

L. Nature of Carpenter's Waste Acid.

All of Carpenter's concentrated waste acids, products of the pickling process,²⁵ were stored in acid holding tanks and subject to regular chemical analysis as a business practice.²⁶ (P-331, Adams Dep. 56:15-57:1; Mann N.T. 11:6-12:25.) Carpenter employees regularly removed samples from the acid tanks and chemical tests were conducted upon those samples. (Polinko N.T. 65:22-66:6.) Test results were recorded on "Analysis Request - Waste Acids" forms. (P-46; Polinko N.T. 66:10-15.) The tests were limited to certain constituent substances; however, the waste acids did contain other metals for which no analytical tests were performed. (Polinko N.T. 75:9-76:6.) The composition of the waste acids varied only slightly over time. (Polinko N.T. 82:22-84:3:19; Mann N.T. 24:9-25.)

From 1973 until June 1974, on average Carpenter's waste hydrochloric acid pickle liquor consisted of (by weight) hydrochloric acid (17%), hydrofluoric acid (0.2%), nitric acid (0.8%), sulfuric acid (0.9%), iron (3.4%), nickel (1.1%), chromium (0.5%), cobalt (0.05%), copper (0.02%), magnesium (0.007%), manganese (0.03%), phosphorus (less than 0.01%), titanium (0.003%), and vanadium (0.02%). (P-40; Mann N.T. 23:16-19, 25:4-27:24; Exner N.T. 98:5-11)

²⁵"Pickling" metal refers to a process where acid is used to remove rust and other impurities from metal. (Adams N.T. 51:11-15; Mann N.T. 7:8-14.) At Carpenter, steel or alloy products were first dipped into salt baths for descaling. (Adams N.T. 50:25-51:10.) After the metals were quenched in water, they were then dipped in a bath of acid. (Adams N.T. 51:8-15; Mann N.T. 7:15-17, 8:16-19.) The type of acid and the duration of the acid bath were dependent upon the characteristics of the metal to be cleansed. (Adams N.T. 51:11-15.) Following the acid bath, the metals were rinsed with water and further processed. (Adams N.T. 51:16-18, 56:6-11; Mann N.T. 8:8-15, 9:4-10.)

²⁶Indeed, Carpenter advised the waste acid hauling vendors of the chemical composition of the waste to be hauled. (Mann N.T. 12:12-25; Polinko N.T. 65:18-21.)

Several of the metals contained in Carpenter's waste acid were found by the EPA at the Boarhead Farms Site. (Compare J-26, Table 7 with P-40; Mann N.T. 29:6-32:19.)

The pH of the Carpenter's waste acid pickle liquor was less than zero.²⁷ (P-40; Mann N.T. 28:25-29:5; Exner N.T. 101:25-102:9; Brown N.T. 57:23-25, 59:15-16.) Carpenter's pickle liquor was a particularly strong acid because the production workers were paid "piecemeal" and would replace the acid baths before they were fully "spent" since fresh acid accelerated the steel cleansing process. (Mann N.T. 58:1-59:8.) The waste hydrochloric acid was a very strong acid.²⁸

²⁷The pH scale is a measure of acidity. (Exner N.T. 102:5-6.) Living systems and water are at a pH of approximately 7, which is neutral. (Exner N.T. 102:6-7; Brown N.T. 47:24-48:2.) The pH scale runs from zero to fourteen, each unit being a factor of ten. (Exner N.T. 102:6-8.) Materials with a low pH, such as zero are potent acids. (Exner N.T. 8-9; Brown N.T. 48:15-18, 59:15-16.)

²⁸Although Carpenter's expert, Dr. Franklin Lee Mink, described Carpenter's waste pickle liquor as "rusty water" (Mink N.T. 219:18-20), this opinion is untrustworthy and rejected in total. First, multiple witnesses, including a former Carpenter employee, testified that the waste pickle liquor had a pH less than zero, indicating that the spent pickle liquor was a very strong acid. (Exner N.T. 102:4-19; Brown N.T. 57:21-59:16; Mann 28:25-5, 58:9-14.)

Furthermore, the Court rejects Dr. Mink's testimony in its entirety due to serious concerns regarding his veracity. Initially, the Court notes that Dr. Mink's CV contained many errors which were, at best, careless mistakes and, at worst, pure fabrications. Although Dr. Mink's CV stated that he possessed an Associate's degree in "Environmental Toxicology", the Associate's degree actually awarded to him was in "Environmental Science" or "Environmental Technology". (Mink N.T. 195:17-25; C-19.) In fact, Dr. Mink could not remember the precise degree. (Mink N.T. 195:22-23.) Additionally, Dr. Mink's CV stated that he had a Bachelor of Science in Biochemistry and a minor in Biology. (Mink N.T. 196:1-197:25; C-19.) However, Dr. Mink actually majored in Biology and minored in Chemistry. (Mink N.T. 196:14-197:15.) Although Dr. Mink claims that this is the equivalent of a degree in Biochemistry, he had no explanation as to why his minor changed from chemistry to biology. (Mink N.T. 196:1-197:25.)

Dr. Mink's CV stated that from 1977 until 1983 he was the Section Chief of the United States EPA, Chemical Support Branch, Health Effects Research Laboratory. (Mink N.T. 198:5-21; C-19.) In fact, Dr. Mink was only the Section Chief from 1980 to 1983. (Mink N.T. 198:19-21.) Again, on his CV, Dr. Mink states that he was the acting director of the EPA Environmental Criterion Assessment Office from 1983 through 1988. (Mink N.T. 199:5-11; C-19.) In fact, Dr. Mink was the acting director from 1986 through 1988. (Mink N.T. 199:9-11.) On the second paragraph of the third page of his CV, Dr. Mink states that while working at Environ, he

(Mann N.T. 28:25-29:5; Exner N.T. 101:25-102:9; Brown N.T. 59:15-21.)

In conclusion, the Court finds as a fact that Carpenter's pickle liquor was a potent acid containing a multitude of metals. (Brown N.T. 59:15-21.)

M. Carpenter's Knowledge and Continuing Business Relationship with Manfred DeRewal, Senior, a Known Polluter.

Carpenter Technology Corporation is a Delaware corporation with its principal place of business in Reading, Pennsylvania. (J-33 ¶ 71.) James Adams began working in Carpenter's engineering department in November 1952. (P-331, Adams Dep. 13:1-3.) His immediate supervisors were William Dinkle and Harold Miller. (P-331, Adams Dep. 29:10-17.) Adams directed the department responsible for tracking the costs related to the disposal of Carpenter's waste acids. (P-331, Adams Dep. 21:6-16.) David Mann began working for Carpenter's engineering department in June 1968 (Mann N.T. 4:4-5:3), working directly under Adams (P-

"oversaw a combined budget of \$400 million and managed over 400 professionals." (C-19; Mink N.T. 200:5-9.) Dr. Mink actually oversaw a budget of \$40 million. (Mink N.T. 200:5-18.) On the fourth page of his CV, Dr. Mink stated that he taught at "Oakland University - SOM." (C-19, page 4; Mink N.T. 200:19-22.) Dr. Mink stated at his deposition that "SOM" meant "School of Medicine." (Mink N.T. 200:23-25.) However, as of Dr. Mink's deposition taken in 2007, Oakland University did not have a school of medicine. (Mink N.T. 201:1-11. But see The News @ OU, *OU, Beaumont Hospitals announce plans for medical school*, April 5, 2007, http://www4.oakland.edu/view_news.aspx?sid=148&id=3803 (last visited July 30, 2008) (stating Oakland University intends to open a medical school in 2010).) On the fourth page of Dr. Mink's CV, under "National/International Honors/Awards", Mink states he served on the United States EPA Advisory Board from 1978-1982 and from 2005-2007. (Mink N.T. 201:25-202:5; C-19, page 4.) In fact, Dr. Mink served on a panel, and not on the Science Advisory Board. (Mink N.T. 202:6-22.) Although Dr. Mink testified that the panel and the board were equivalent, one is a paid position and one is not. (Mink N.T. 202:9-21.) Moreover, Dr. Mink's own deposition testimony indicates that, at the time his deposition was taken, he did not think his position on the panel was equivalent to one on the Science Advisory Board. (Mink N.T. 202:16-22.)

Dr. Mink's vacillations on his professional and academic qualifications contribute to this Court's strong conclusion that his professional opinions are of no utility. Simply stated, it is unwise to rely upon the opinions of an expert who is uncertain of his own qualifications.

331, Adams Dep. 28:10-29:7).

Mann and Adams were both involved in the decisions of Carpenter's purchasing department with respect to purchasing waste disposal services. (Mann N.T. 4:25-9.) Carpenter hired Echo Incorporated, a company owned by Manfred DeRewal, Senior to haul its waste acids. (DeRewal, Sr. Dep. 136:23-137:4, 211:25-212:8; P-44.) On July 8, 1969, Adams received a phone call from a regulatory authority that Echo had encountered difficulties as a result of subsurface pollution at the Revere site. (P-331, Adams Dep. 82:14-84:25.) Of initial importance is that the subject line of Adams' handwritten note from this telephone conversation reads "Re: Echo Inc. (Revere Chemical Co.) & Chemline." (P-44.) This entry demonstrates that Carpenter was familiar with both Echo Incorporated and Revere Chemical Corporation—two companies helmed by Manfred DeRewal, Senior prior to his incorporation of DCC—both of which were shut down due to pollution problems. (P-13, page 2; P-333, DeRewal, Sr. Dep. 15:24-17:17. See also J-24, Appendix D-1.5, AR100152 (news article stating that DeRewal, Senior "has been a principal in at least six corporations that in the past 10 years have been cited for toxic discharges into river and streams in Bucks County.")) During the same phone call, Adams learned that Chemline, another waste acid hauler used by Carpenter, had illegally dumped waste acid into an abandoned slag pit.²⁹ (P-331, Adams Dep. 83:22-84:3.) Adams usually did not make notes of his telephone conversations (P-331, Adams Dep. 85:21-24; 86:13-15), however since Adams knew the information conveyed to him over the phone from the regulatory authority was important, he recorded the information in writing and maintained his record of that conversation.

²⁹Carpenter continued to use Chemline's waste acid removal services despite actual notice of state concerns with Chemline pollution. (See P-36 (detailing gallons of waste hauled by Chemline from Carpenter during 1973 and 1974).)

(P-331, Adams Dep. 86:1-4; 86:18-21.) Additionally, Adams stated unequivocally that he advised Carpenter's upper management of this conversation. (P-331, Adams Dep. 87:3-15.) The Court accepts Adams' testimony as a statement of factual truth.

On July 15, 1969, one week after Adams received the phone call alerting Carpenter to the pollution practices of Echo and Revere Chemical, Scharfstein³⁰ and Mann, two Carpenter employees, visited the Revere Chemical facility to evaluate whether Carpenter should hire Revere to remove its waste acids. (P-43; P-331, Adams Dep., Ex. Mann-9, "Trip Report to Revere Chem. Corporation."; Mann N.T. 34:11-17.) Two days after visiting the Revere Chemical facility, Scharfstein wrote a memorandum memorializing the trip, which specifically stated that Manfred DeRewal was the President of Revere Chemical Corporation and that it was "mutually beneficial for Carpenter to establish good relations with East Falls Chemical³¹ since they may be of great assistance is extricating [Carpenter] from waste disposal problems at a reasonable cost."³² (P-43.) It was Carpenter's normal business practice that each person listed as a "cc" on a Carpenter memo or letter receive a copy of that memo or letter. (Mann N.T. 17:13-15; P-331, Adams 78:2-5.) Scharfstein's July 17, 1969 memo was circulated to Carpenter's

³⁰Scharfstein was the manager of chemical technology research at Carpenter. (See P-43, page 2.)

³¹The memo states that East Falls Chemical Corporation is an agent of Revere Chemical Corporation. (P-43; See also P-331, Adams Dep., Ex. Mann-9.) Thus Carpenter knew that East Falls Chemical Corporation was working for Revere and associated with Manfred DeRewal, Senior.

³²Also of interest is Scharfstein's statement in the July 17, 1969 memo that, although Revere claimed that its staff consisted of twenty-five people, Mann and Scharfstein only saw eight or ten. (P-43.) Scharfstein's notation of this discrepancy implies that he questioned DeRewal Senior's truthfulness.

upper management. (P-43.)

Despite the phone call from the regulatory agency warning Carpenter of Revere's pollution practices, Carpenter nonetheless hired Revere Chemical Corporation to haul its waste acids. (P-45, P-42, P-43.) Shortly thereafter, on February 25, 1970, Mann circulated a memorandum to Carpenter personnel stating that Revere ended its operations in January 1970 due to pollution problems. (P-45.) By the February 25, 1970 memo, Mann informed numerous Carpenter personnel, including upper management, that Revere's operations ended due to pollution problems. (P-45.) Carpenter personnel who received Mann's February 25, 1970 memo, and were therefore aware of Revere's pollution problems, included William Dinkel (chief engineer), Harold Miller (assistant vice president and president of construction), Freehafer (director of purchasing), and Nahm (senior buyer), Schattner (attorney for Carpenter), and Karpen (supervisor directly involved with testing the waste acids). (P-45; P-331, Adams Dep. 29:10-17; Cheri N.T. 105:21-22; Mann N.T. 48:17-49:10.)

Thus, through Scharfstein, Mann, Adams and the purchasing department, Carpenter was actually aware of Manfred DeRewal, Senior's relationship to Revere Chemical Company and Echo Incorporated. (Mann N.T. 33:20-25; P-42; P-43; P-45.) Carpenter's personnel acknowledged Manfred DeRewal Senior's relationship to Revere Chemical Company. (Mann N.T. 33:20-25.) Indeed, in his notes, Mann listed "Fred DeRewal" as a person to be contacted at Revere when waste acid was ready for pick up. (P-42; Mann N.T. 40:15-44:24.)

Nonetheless, Carpenter hired Manfred DeRewal yet again, time in the form of DeRewal Chemical Company, to dispose of its waste acid. (P-34.) DCC charged Carpenter a rate far below any of the other waste haulers at the time. (P-39, P-35.) While DCC charged

\$0.04/gallon, other waste haulers during that time period charged \$0.06/gallon (King of Prussia), \$0.07/gallon (KRG Services), and \$0.074/gallon (Chemline). (P-39.) The differential between DCC's rate and that of the other waste haulers was so great³³ that, when combined with actual knowledge of DeRewal Senior's pollution practices, this Court can only conclude that Carpenter chose to retain DCC for economic reasons in spite of its actual awareness of DeRewal Senior's known status as a notorious environmental polluter. This conclusion is made explicit by the February 25, 1970 memo, which states that Revere Chemical Company was shut down due to "pollution citations" and that "[b]ecause of the *substantial savings* realized by CarTech [Carpenter] during this venture, other programs will be evaluated for utilization of our waste acids." (P-45 (emphasis added).) The economic motivation for hiring DCC is further illuminated by Reger's testimony that, in the purchase of waste acid removal services, all Carpenter cared about was saving a dollar. (P-330, Reger Dep. 19:2-21.)

For these reasons, this Court concludes Carpenter hired DeRewal Chemical Company to dispose of its waste acids, despite actual knowledge that DCC's owner and operator, DeRewal Senior, had a history of environmental pollution. This decision was economically motivated since the per gallon price charged by DCC was significantly below the bids submitted by other vendors.

N. Carpenter's Lack of Cooperation.

Carpenter received a Section 104(e) Request from EPA for the Boarhead Farms Site. (J-33 ¶ 75.) Carpenter received a General Notice/Special Notice Letter from EPA dated September

³³DCC's fee was 33.33 percent lower than the bid of King of Prussia, 42.86 percent lower than the bid of KRG and 45.95 percent below the bid of Chemline.

28, 2000. (J-33 ¶ 76.) The letter asked Carpenter to resolve its potential liability to the United States for the alleged past costs incurred, and to agree to perform the work required by the ROD, but not included in the 2000 Consent Decree. (J-33 ¶ 76.) Carpenter did not cooperate with the EPA.

O. Allocation

The Boarhead Farms Site is a very complicated environmental system that will require an extensive cleanup for an indefinite future period. (Brown N.T. 71:3-18.) The complexity derives from numerous factors. The first contributing factor is the pattern of waste disposal at the Site. (Vandeven N.T. 156:18-157:15, 182:23-187:17.) Over the years, many different types of waste were disposed at the Boarhead Farms Site. (Vandeven N.T. 137:21-138:11, 156:22-157:15.) Additionally, the wastes disposed came in various forms, such as bulk releases of large quantities of liquids and buried drums. (Vandeven N.T. 156:22-157:5.) Moreover, the differing wastes were disposed in multiple and overlapping locations. (J-30, Figure 1-4; Vandeven N.T. 146:20-147:1, 148:11-21.)

Because various types of waste were disposed at multiple and overlapping locations, the waste interacted, releasing a wide variety of hazardous substances into the environment, contributing to the complex environmental conditions and necessitating the response activities taken at the Site. (Vandeven N.T. 148:11-21, 156:18-157:15, 185:20-187:8.) For example, bulk acids disposed at Boarhead Farms interacted with both naturally and non-naturally occurring metals, increasing the solubility and mobility of the metals. (Vandeven N.T. 164:5-167:23.) Metal drums buried at the Site were corroded by bulk acids disposed at the Site, thereby causing the drums to release their contents. (Vandeven N.T. 157:3-9.) Buried drums containing acid

waste corroded, releasing their contents to interact with other waste and environmental media. (Vandeven N.T. 157:10-12.) Additionally, bulk acidic waste disposed at the Boarhead Farms increased the solubility and mobility of naturally occurring metals, thereby causing the metals to enter the groundwater, thus increasing the level of contaminants in the groundwater. (Vandeven N.T. 167:1-23.)

Acids disposed of at the Site also exhausted the buffering capacity of the soil. (Vandeven N.T. 168:19-169:14.) Exhaustion of the buffering capacity caused the acid wastes and contaminants in the acid waste to move more readily through the soil. (Vandeven 169:15-24.) Exhaustion of the buffering capacity also allowed non-acidic contaminants to move more readily through the soil. (Vandeven N.T. 170:5-9.) Indeed the soils reached such an acidic level at the site that they are digesting themselves. (Brown N.T. 64:12-17.) As acids digest the soil, the soil gives off acidic ions, which further digest the soil. (Brown N.T. 64:12-17.) Thus today, no less than twenty years after the acid was dumped at Boarhead Farms, the soils have not yet returned to their original pH, and there is no natural mechanism to neutralize the soils at the Site. (Brown N.T. 62:20-62:17.)

Thus, the acid wastes, by increasing the solubility and mobility of metals and exhausting the buffering capacity of the soil, contributed substantially to the release of metals and other contaminants into the environment at Boarhead Farms. (Vandeven N.T. 164:5-170:9, 172:15-173:13.) The mobilized metals entered the groundwater, thereby increasing the concentration of contaminants in the groundwater. 164:5-166:25, 168:7-13, 172:15-173:9, 210:12-211:9.) Moreover, metals that were actually contained within acid waste would flow through the soil and groundwater much more readily adding massive contaminants to the groundwater. (Vandeven

N.T. 174:20-175:5.) As a result, nearly all of the groundwater at Boarhead Farms is contaminated. (Vandeven N.T. 151:1-154:21, 163:17-164:4; J-30, Figures 1-5 and 1-6.)

The contaminated groundwater at Boarhead Farms is of particular concern. (Vandeven N.T. 135:16-138:11.) In fact, the baseline human health risk assessment in the Remedial Investigation and Feasibility Study concluded that the risks associated with residential use of groundwater at both on-site and off-site locations, including residential wells, exceeded acceptable limits. (Vandeven N.T. 173:14-19, 176:14-179:20; J-26, Table 7.) Among other contaminants, metals were present in the groundwater at levels the EPA considered to exceed acceptable standards. (Vandeven N.T. 176:14-179:20.) Additionally, the groundwater in the vicinity of the areas where acid wastes were dumped, was highly acidic when tested in the 1990s, and had a pH as low as four. (Brown N.T. 48:3-49:8.) The waste acids dumped in the areas where the water was sampled were the cause of the low pH. (Brown N.T. 506-507.)

The need for remediation at the Site is driven by inorganic and organic chemicals in the soil and groundwater.³⁴ (Vandeven N.T. 137:15-138:11, 142:5-18) Metals, in particular,

³⁴Dr. Mink opined that 95% of the baseline risk assessment (EPA's assessment of the risk the Site poses to human health and the environment) was caused by volatile organic compounds ("VOCs"), semi-volatile organic compounds ("SVOCs"), and arsenic, and that therefore 95% of the remediation costs were caused by VOCs, SVOCs, and arsenic. (Mink N.T. 190:1-24.; 205:9-206:3.) In other words, Dr. Mink opined that the response costs at the Site were driven by the risk posed by particular contaminants.

However, there is no evidence that the greater the risk a particular contaminant poses to human health or the environment, the greater the response cost of cleaning that contaminant. In fact, at the Boarhead Farms Site, the groundwater treatment plant is treating many different contaminants, at the same cost, regardless of the risk they pose. (Seibel N.T. 64:11-75:8.) Moreover, there is ample evidence that all of the contaminants disposed of at the site commingled and interacted with each other exacerbating the environmental impact, such that the effects of one contaminant cannot reasonably be separated from the effects of other contaminants. (Vandeven N.T. 156:18-157:15, 182:23-187:17; Brown N.T. 71:3-78:18.)

contributed to the need for and cost of remediation at the Boarhead Farms Site. (Vandeven N.T. 176:14-179:20, 180:11-16.) This is illustrated by the fact that all of the remedial alternatives that were considered for the Site involved precipitation of the metals to reduce their concentration in the groundwater. (Vandeven N.T. 180:6-181:18.)

Although the levels of metals in the groundwater is of concern, the EPA identified a total of fifty-three chemicals of potential concern in the shallow groundwater. (J-26, Table 7.) This varied and widespread contamination is a result of waste disposal in multiple and overlapping areas, and the concomitant commingling and dispersal of the waste throughout the soil and groundwater. (Vandeven 185:25-186:8.) As such, no accurate or reliable method exists to distinguish one party's waste from the waste of another party. (Vandeven 186:9-187:17; Brown 54:10-19.) Furthermore, there is no way to separate out the remediation of any particular contaminant or group of contaminants. (Vandeven N.T. 182:23-187:17; Brown 54:10-19.) Therefore, the costs of investigating and remediating the Boarhead Farms Site cannot be compartmentalized according to any particular contaminant or group of contaminants. (Vandeven N.T. 186:9-187:17; Brown 54:20-55:22.) Stated differently, all of the funds expended investigating and remediating the Site are a direct result of each and every waste stream at the Site. (Vandeven N.T. 186:9-187:17; Brown 64:25-65:3.)

III. Conclusions of Law

A. Trial Stipulations

The following stipulations were submitted by the parties at trial and are accepted by the Court.

1. The Boarhead Farms Superfund Site, located in Upper Black Eddy, Pennsylvania,

is a “facility” as defined in 42 U.S.C. § 9601(9).

2. The Site is a “site” as defined in Section 103 of the HSCA, 35 P.S. § 6020.103.
3. “Hazardous substances” as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14) were disposed of, placed on, or otherwise became located at the Site.
4. There have been “releases” as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22), or threatened releases of hazardous substances into the environment at or from this Site.
5. There have been “releases” or “substantial threats of releases” of “hazardous substances” and “contaminants” into the environment at or from the Site, as those terms are defined in Sections 101(22), 103 and 501(a) of HSCA, 35 P.S. §§ 6020.101(22), 6020.103, and 6020.501(a).
6. The release or releases have caused the incurrence of “response” costs at the Site, as defined in 42 U.S.C. § 9601(25).
7. Carpenter Agere, Cytec, Ford, SPS, and TI are all persons as defined in 42 U.S.C. § 9601 and 35 P.S. § 6020.103.
8. The costs incurred by the OU-1 and OU-2 Groups were necessary to comply with the requirements of the ROD and were consistent with the National Contingency Plan.

B. Orphan Shares

An “orphan share” is the share of waste from unidentifiable sources or insolvent PRPs. Action Mfg. Co., Inc. v. Simon Wrecking Co., 428 F. Supp. 2d 288, 328 (E.D. Pa. 2006). Orphan shares should be allocated equitably among plaintiff and defendant PRPs. In this particular case, the Court will not consider any volumes of waste from unidentifiable sources or insolvent PRPs because any such wastes would be orphaned, and there is no legal or equitable reasons to allocate such orphan shares to any particular party. All parties had the opportunity to bring claims in this action against any person whom they believed to be liable. Consequently, any orphan share would be allocated pro-rata amongst all the parties, in which case the parties’

shares, relative to each other, would not change.

Knoll International is also an orphan share. Knoll's share is not equitably or legally allocable to any party. As such, Knoll's waste will not be considered in determining the plaintiffs', settled parties', or Carpenter's percentage share of waste disposed of at the Site. Diaz' share of the volume of waste disposed of at the Site is an orphan share. (October 29, 2007 Order at 1.) It was previously determined by this Court that AETC was responsible for Diaz' waste stream. (October 29, 2007 Order.) Because plaintiffs settled with AETC, plaintiffs are responsible for Diaz' volumetric share.

C. Plaintiffs' Claims

CERCLA § 113(f) "authorizes a PRP to seek contribution 'during or following' a suit under § 106 or § 107(a)." United States v. Atlantic Research Corp., 127 S. Ct. 2331, 2338 (quoting 42 U.S.C. § 9613(f)(1)). Likewise, PRPs who resolved their liability to the United States or a State through an administrative or judicially approved settlement can seek contribution through § 113(f)(3)(B). Atlantic Research, 127 S. Ct. at 2338 n.5; 42 U.S.C. § 9613(f)(3)(B). However, a PRP who voluntarily incurs response costs cannot seek contribution from other PRPs under § 113(f).

Rather, in Atlantic Research, the Supreme Court held that costs incurred voluntarily by a PRP, which are not reimbursement, are recoverable under § 107(a)(4)(B). Atlantic Research, 127 S. Ct. at 2338. In other words, a PRP "may recover under § 107(a) without any establishment of liability to a third party." Id. The Court specified that when a PRP pays money to satisfy a settlement agreement or court judgment it does not "incur its own costs of response", but rather, reimburses another party. Id. Thus, a PRP who pays money pursuant to a settlement

or court judgment can only seek recovery by way of a § 113(f) contribution claim. Id.

One question specifically left undecided in Atlantic Research was whether costs of response which are compelled, but not reimbursement, are recoverable under § 113(f), or § 107(a), or both. Id. at 2338 n.6. The Atlantic Research Court cited United Technologies Corp. v. Browning-Ferris Indus., Inc., 33 F.3d 96, 97 (1st Cir. 1994), as an example of costs that were compelled but not reimbursement to another party. In United Technologies, the parties to the consent decree agreed “to undertake and complete corrective work at the Site in accordance with a plan for remedial action.” 33 F.3d at 97. When the parties made payments for the corrective work, these expenditures were not voluntary because they were compelled under the Consent Decree. However, monies spent by the parties went directly to the corrective work, and thus did not constitute reimbursement. Thus, after Atlantic Research, it is an open question of law as to whether obligations a party incurs pursuant to a Consent Decree, which are not reimbursement, are recoverable under § 113(f), § 107(a), or both. 127 S. Ct. at 2338 n.6.

This is of potential concern as an award under § 113(f) is not identical to one under § 107(a). Although in Atlantic Research the Supreme Court declined to decide whether § 107(a) provides for joint and several liability, it is the law of the Third Circuit that recovery under § 107(a) is joint and several. See Atlantic Research, 127 S. Ct. at 2339 n.7 (assuming without deciding that § 107(a) provides for joint and several liability). But see E.I. DuPont De Nemours and Co. v. United States, 460 F.3d 515, 521-22 (3d Cir. 2006) (stating that § 107(a) provides for joint and several liability) (reversed on other grounds). Thus, any recovery by plaintiffs in this case under their § 107 claims would be joint and several.

In the present action, following the Atlantic Research decision, plaintiffs amended their

complaint to include claims under both § 107 and § 113(f). Cytec, Ford, SPS, and TI have claims under CERCLA § 113(f) for EPA's past response costs, which these entities reimbursed to EPA pursuant to the OU-2 Consent Decree. (Pls.' Fifth Am. Compl.)

Agere was not a party to either of the 2000 or 2001 Consent Decrees. (See J-6; J-7; J-33 ¶¶ 24; 40.) However, Agere agreed with the signatories to the Consent Decrees to fund and perform the OU-1 and OU-2 remedial design and remedial action ("RD/RA") work, and to pay for the EPA's oversight costs related to this work. (J-33 ¶¶ 25, 41.) Agere seeks recovery under § 107 for the sums it paid pursuant to its agreement with the parties to the 2000 and 2001 Consent Decrees.

TI was a party to the 2001 Consent Decree, but not the 2000 Consent Decree. (J-33 ¶¶ 24, 40.) However, TI agreed with the parties to the 2000 Consent Decree to fund and perform the OU-1 RD/RA work, and to pay for the EPA's oversight costs related to this work. (J-33 ¶ 25.) Because TI was not a party to the 2000 Consent Decree, it has a cost recovery claim under § 107 for sums it paid to fund the OU-1 work and for EPA's oversight costs related to that work. In addition, TI has claims under § 107 and § 113(f) for the OU-2 RD/RA work and the EPA's oversight costs related to that work, as these costs were compelled under the Consent Decree but were not reimbursement to the EPA.

Cytec, Ford, and SPS, signatories to the 2000 and 2001 Consent Decrees, have § 107 and § 113(f) claims for the OU-1 RD/RA work, EPA's costs related to the OU-1 work, the OU-2 RD/RA work, and EPA's costs related to the OU-2 work, as these costs were not reimbursed to the EPA.

In addition, Carpenter has CERCLA § 113(f) counter-claims against all plaintiffs.

The Court shall resolve all parties' claims by determining the equitable shares of Carpenter, Cytec, Ford, SPS, TI, Agere and the settled parties.

D. Statute of Limitations

CERCLA § 113(f) provides PRPs with the right to contribution. 42 U.S.C. § 113(f)(1); United States v. Atlantic Research Corp., 127 S.Ct. 2331, 2337 (2007). "Thus, § 113(f)(1) permits suit before or after the establishment of common liability." Atlantic Research, 127 S.Ct. 2338. If a PRP settles a claim with EPA through a Consent Decree, in order to assert a contribution claim against other PRPs, the EPA's claim must have been valid at the time of the settlement. If EPA's claim were not valid, there would be no common liability to serve as the basis for a contribution action.

Carpenter argues that, "at the time [p]laintiffs Cytec, Ford, SPS and TI signed the OU-2 Consent Decree, [p]laintiffs were not liable to the USEPA for any recovery costs because the statutory period authorizing USEPA to seek those costs had expired." (Doc. No. 407, page 7.) Therefore, Carpenter contends that there was no common liability between it and plaintiffs to serve as the basis for plaintiffs' contribution claims under § 113(f).³⁵

1. CERCLA Statute of Limitations for § 107(a) Claims.

The relevant CERCLA statute of limitations is 42 U.S.C. § 9613(g)(2), which governs the timeliness of an EPA § 107 claim against plaintiffs. The statute of limitations reads as follows:

(2) Actions for recovery of costs

³⁵For clarity it should be noted that Carpenter's statute of limitations defense only concerns Cytec, Ford, SPS, and TI's § 113(f) claims arising from the OU-2 Consent Decree. Agere has a § 107(a) claim for the past response costs. Thus, for purposes of this section discussing the statute of limitations, the term plaintiffs refers to Cytec, Ford, SPS, and TI.

An initial action for recovery of the costs referred to in section 9607 of this title must be commenced—

(A) for a removal action, within 3 years after completion of the removal action, except that such cost recovery action must be brought within 6 years after a determination to grant a waiver under section 9604(c)(1)(C) of this title for continued response action; and

(B) for a remedial action, within 6 years after initiation of physical on-site construction of the remedial action, except that, if the remedial action is initiated within 3 years after the completion of the removal action, costs incurred in the removal action may be recovered in the cost recovery action brought under this subparagraph.

42 U.S.C. § 9613(g)(2). In order to apply this statute of limitations, it is necessary to know what type of activities can be considered part of a “removal action” and what type of activities can be considered part of a “remedial action.” The term “removal” is statutorily defined as:

[T]he cleanup or removal of released hazardous substances from the environment, such actions as may be necessary taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 9604(b) of this title, and any emergency assistance which may be provided under the Disaster Relief and Emergency Assistance Act [42 U.S.C.A. § 5121 et seq.].

42 U.S.C. § 9601(23). Remedial action is defined as:

[T]hose actions consistent with permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection using dikes, trenches, or ditches, clay cover, neutralization, cleanup of released hazardous substances and associated contaminated materials,

recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, onsite treatment or incineration, provision of alternative water supplies, and any monitoring reasonably required to assure that such actions protect the public health and welfare and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President determines that, alone or in combination with other measures, such relocation is more cost-effective than and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition offsite of hazardous substances, or may otherwise be necessary to protect the public health or welfare; the term includes offsite transport and offsite storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials.

42 U.S.C. § 9601(24). These two definitions, which apply to key terms in the statute of limitations, are somewhat vague and uncertain, and overlap. Geraghty and Miller, Inc. v. Conoco Inc., 234 F.3d 917, 926 (5th Cir. 2000) (“[T]he CERCLA definitions are expansive enough that certain activities may well be covered by both.”). United States v. Manzo, 182 F. Supp. 2d 385, 400 (D. N.J. 2000) (“These definitions obviously overlap.”). As with other ambiguous CERCLA provisions, the statute of limitations should be construed in a manner consistent with CERCLA’s broad remedial purpose and overriding policy of cleaning up hazardous waste at the expense of those who created it. Manzo, 182 F. Supp. 2d at 401 (citing FMC Corp. v. Dep’t of Commerce, 29 F.3d 833, 840 (3d Cir. 1994)). Kelley v. E.I. DuPont de Nemours and Co., 17 F.3d 836, 843 (6th Cir. 1994).

2. EPA’s Claim was Not Time Barred.

Plaintiffs signed the Administrative Order On Consent, EPA Docket No. III-2001-0010-DC, on March 29, 2001.³⁶ (J-9, pages BSAI052835-38.) Through this agreement, plaintiffs

³⁶Cytec signed the Consent Order on March, 29, 2001, Ford signed on March 23, 2001, SPS signed on March 28, 2001, and TI signed on March 29, 2001. (J-9, pages BSAI052835-38.)

agreed to pay EPA \$7,000,000 for past response costs.³⁷ (J-9, page 052894.) At the time plaintiffs entered into this agreement, EPA's potential cause of action for the past response costs was not barred by the statute of limitations.

The EPA conducted a single "removal action" which ended, at the earliest, on November 18, 1998, when EPA issued the ROD.³⁸ (J-26.) Carpenter's attempt to parse out EPA's response activity into separate removal actions is untenable. All of EPA's response actions—beginning with the Remedial Investigation in 1984 and continuing through the ROD—were interdependent. Take, for example, a marathon runner who must tie her shoes before a race. While this activity is very different from the actual running of the race, the marathoner would find it quite difficult to complete the race having not tied her shoes. In much the same way, the EPA's actions were all built upon one another and were interrelated and interdependent. EPA's Preliminary Assessment and Site Investigation confirmed contamination at the Site, which led EPA to conduct a more thorough Remedial Investigation. This in turn alerted EPA that immediate action should be taken with respect to some hazardous waste at the Site. For example, EPA excavated and removed some of the buried drums and intercepted the groundwater to remove volatile organic compounds. In the meantime, EPA conducted a Feasibility Study, made a decision regarding the remedial action to be taken, and began the remedial design. All of this activity falls under the purview of "removal action," as defined by 42 U.S.C. § 9601(23), and because it is one

³⁷EPA's past response costs were actually in excess of \$13 million, but plaintiffs settled this claim for \$7,000,000. (J-18; Judge N.T. 50:14-23.)

³⁸It is more likely that EPA's removal action was ongoing as of September 28, 2000. (See J-7, BSAI103746 ¶ G ("EPA conducted removal action at the Site . . . continuing to the present.")) However, in giving Carpenter every reasonable consideration, the Court selects the earlier date.

continuous interrelated process, it constitutes a single removal action. (Brown N.T. 71:11-72:9.) See also Kelley v. E.I. DuPont de Nemours and Co., 17 F.3d 836 (6th Cir. 1994) (finding that site inspection and sampling, which were followed by physical removal of drums and then a remedial investigation and feasibility study, constituted one single removal action).

Carpenter cites several instances in which the EPA seemingly refers to multiple removal actions at Boarhead Farms. (See J-26, page 3, 11;³⁹ J-23, page 3, 4, 7.) However, as addressed in this Court's previous Order dated April 22, 2008 (Doc. No. 317), in certain other instances EPA refers to a single or continuous removal action. (See, e.g., J-6, BSAI103746, ¶ G.) More importantly, however, characterizing EPA's conduct as four separate removal actions does not accurately describe actual activity at the Site. First, it ignores the fact that all of EPA's activities during this time were interrelated and interdependent. Second, the supposed four removal actions only encompass three drum excavations⁴⁰ and the interception of groundwater (essentially, the physical removal activity at the Site). This characterization completely ignores EPA's Preliminary Assessment, Site Investigation, Remedial Investigation and ROD, among other activities, all of which are removal activities but would, apparently, not be covered under defendant's conceptualization.

When plaintiffs entered into the OU-2 Consent Decree, they not only agreed to reimburse EPA for past costs related to the removal action, but they also agreed to perform the OU-2

³⁹Carpenter also quotes passages from pages 10 and 16 of the Record of Decision as having references to multiple removal actions. (See Doc. No. 407, page 9.) However, review of the ROD indicates that no such quotations (or any reference to multiple removal actions) exist on those pages. (See J-27, page 10, 16.)

⁴⁰One of which was conducted and paid for by General Ceramics and is not related to this litigation.

remedial design and remedial action and to pay for any costs incurred by EPA related to the OU-2 work. Thus, plaintiffs agreed to perform remedial action that EPA would otherwise have performed.⁴¹ This is evidenced by the 2001 Consent Decree which states that plaintiffs “will *assume responsibility* for the performance of a portion of the [remedial design] and *all of the [remedial action]* for all OU-2 Activities” (J-7, page BSAI052846 (emphasis added).)

When plaintiffs signed the OU-2 Consent Decree, it was reasonable for them to believe that, if they did not sign it, EPA would begin the OU-2 remedial action before November 18, 2001. EPA’s remedial action would therefore commence within three years of the removal action, providing for a six year statute of limitations, and allowing cost recovery of both the removal and remedial actions under 42 U.S.C. § 9613(g)(2)(B). Because EPA was not foreclosed from bringing a claim against plaintiffs under § 107(a) for its past response costs, plaintiffs and Carpenter shared a common liability to EPA. Plaintiffs settled this liability and are therefore entitled to contribution from Carpenter.

Moreover, a contrary conclusion would encourage PRPs to delay and discourage settlement with the EPA. If PRP’s were not entitled to contribution for settled claims which *might* have been barred by the statute of limitations, then there would be no incentive to settle such claims. Rather, PRPs would be encouraged to wait and see if EPA inadvertently allowed its claims to spoil. This is in contravention to CERCLA’s goal of encouraging prompt and effective cleanups.

Because EPA’s claims were not time barred at the time plaintiffs entered into the OU-2

⁴¹The OU-1 and OU-2 work detailed in the ROD constitutes remedial action as it is “consistent with a permanent remedy taken . . . to . . . minimize the release of hazardous substances” 42 U.S.C. § 9601(24).

Consent Decree, plaintiffs have valid contribution claims against Carpenter.

E. CERCLA Liability and Allocation.

Under § 113(f), a plaintiff must demonstrate liability under § 107 and that apportionment is feasible. New Jersey Turnpike Authority v. PPG Industries, Inc., 197 F.3d 96, 104 (3d Cir. 1999). Liability under CERCLA § 107 is established by demonstrating that: (1) the defendant is a potentially responsible party (“PRP”); (2) hazardous substances were disposed at a facility; (3) there has been a release or threatened release of hazardous substances from the facility into the environment; and (4) the release or threatened release required or will require the plaintiff to incur response costs. See 42 U.S.C. § 9607(a); New Jersey Turnpike Auth. v. PPG Industries, Inc., 197 F.3d 96, 103-04 (3d Cir. 1999). The definition of PRP includes “any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances owned or possessed by such person, by any other party or entity, at any facility . . . owned or operated by another party or entity and containing such hazardous substances.” 42 U.S.C. § 9607(a)(3).

In addition to these four elements, the plaintiff must also prove what is commonly referred to as the “nexus” requirement. New Jersey Turnpike Auth., 197 F.3d at 105. This burden is not onerous, and plaintiff need not prove a specific causal link where there are multiple sources of contamination. Id. at 105; United States v. Alcan Aluminum Corp., 964 F.2d 252, 266 (3d Cir. 1992). Rather, the nexus requirement is met where a plaintiff shows some connection between the defendant’s activities and the contamination at the site. New Jersey Turnpike Auth., 197 F.3d at 105. Where a plaintiff alleges that a PRP “arranged for the transportation or disposal of hazardous substances . . . such a plaintiff must simply prove that the defendant’s hazardous

substances were deposited at the site from which there was a release and that the release caused the incurrence of response costs.” Id. at 104 (internal quotations omitted) (citing Alcan Aluminum Corp., 964 F.2d at 266).

After liability under § 107 is demonstrated, the plaintiff must then show that apportionment is feasible. The court “may allocate response costs among liable parties using such equitable factors as the court determines are appropriate.” 42 U.S.C. § 9613(f)(1). The district court has discretion in determining what factors to consider. Beazer East, Inc. v. Mead Corp., 412 F.3d 429, 446 (3d Cir. 2005). Equitable factors often considered by courts are those listed in the unsuccessful CERCLA amendment proposed by then-Representative Al Gore. Action Mfg. Co., Inc. v. Simon Wrecking Co., 428 F. Supp. 2d 288, 329 (E.D. Pa. 2006) (gathering cases in the Third Circuit). These factors, commonly referred to as the “Gore Factors”, include: (1) the ability of the parties to demonstrate that their contribution to a discharge, release, or disposal of a hazardous waste can be distinguished; (2) the amount of hazardous waste involved; (3) the degree of toxicity of the hazardous waste involved; (4) the degree of involvement by the parties in the generation, transportation, treatment, storage, or disposal of the hazardous waste; (5) the degree of care exercised by the parties with respect to the hazardous waste concerned, taking in to account characteristics of such waste; and (6) the degree of cooperation by the parties with Federal, State, or local officials to prevent any harm to the public health or environment. 126 Cong. Rec. 26,799-81 (1980); See also Action Mfg. Co., Inc., 428 F. Supp. 2d at 329.

1. Carpenter is a liable party under CERCLA § 107(a).

Carpenter stipulated to three of the four elements of the CERCLA § 107 action. (J-33 ¶¶

1, 2, 4, 5, 7, 8.) Specifically, Carpenter stipulated that the Boarhead Farms Superfund Site is a facility (J-33 ¶¶ 1-2), that hazardous substances were disposed at the Site (J-33 ¶ 4), that there were releases or threatened releases of hazardous substances into the environment at or from the Site (J-33 ¶ 5), and that the releases or threatened releases caused the incurrence of response costs at the Site (J-33 ¶ 7). At trial, Carpenter disputed that it is a PRP. Additionally, Carpenter argued that plaintiffs failed to meet their burden with respect to establishing a nexus between any Carpenter waste and the Boarhead Farms Superfund Site.

a. Carpenter is a Potentially Responsible Party.

The Court finds that Carpenter Technology arranged with DCC for the transportation and disposal of hazardous substances, and is therefore a potentially responsible party as defined in 42 U.S.C. § 9607(a)(3). Initially, it is notable that there was a written contract between Carpenter and DCC in which DCC agreed to “remove and suitably dispose of waste hydrochloric acid pickling solution (“acid”) from Carpenter’s plant in Reading, Pennsylvania.” (P-34.) Carpenter and DCC entered into this contract on June 12, 1973. (Id.) The contract had no termination date, but was to continue subject to termination at any time by either party upon thirty days notice. (Id.)

Moreover, Carpenter’s spent hydrochloric acid pickling solution (“waste pickle liquor”) is a hazardous substance as defined in CERCLA. Spent pickle liquor generated by steel finishing operations is itself listed as a hazardous substance under CERCLA. 42 C.F.R. § 302.4. Additionally, Carpenters’ waste pickle liquor contained multiple metals,⁴² many of which are

⁴²The waste pickle liquor contained significant amounts of iron, nickle, and chromium, and smaller amounts of cobalt, copper, magnesium, manganese, phosphorus, titanium, and vanadium. (P-40.)

CERCLA hazardous substances. 42 U.S.C. § 9601(14); 40 C.F.R. § 302.4. Lastly, Carpenter's waste pickle liquor is corrosive (Vandeven N.T. 157:5-13; 164:5-12; 172:19-22), rendering it a hazardous waste under the RCRA, and therefore under CERCLA as well. 42 U.S.C. § 9601(14); 42 U.S.C. § 6921; 40 CFR § 261.20.

In sum, the Court finds that Carpenter arranged for DCC to transport its waste pickle liquor, a hazardous substance as defined in CERCLA. As such, Carpenter is a potentially responsible party as that term is defined in 42 U.S.C. § 9607(a)(3).

b. Plaintiffs Established a Nexus Between Carpenter's Waste and the Boarhead Farms Superfund Site.

As stated in Section II, Findings of Fact, *supra*, the Court finds the testimony of the DCC truck drivers that they disposed of Carpenter's waste acids at the Boarhead Farms Site highly credible. First, all of the drivers's testimony regarding DCC's waste disposal practices, whether presented through deposition transcript or live testimony, was consistent and rings true despite the passage of decades. Carpenter's characterization of Bruce and Freddie DeRewal's testimony as "conflicting" is unfair. Additionally, the Court rejects Carpenter's opinion of the veracity of Bruce and Freddie DeRewal, both of whom were credible.

As such, plaintiffs established a nexus between Carpenter's waste and the Boarhead Farms Site.

2. Equitable Allocation.

Based on the record before us, it is not possible to fairly and equitably allocate the costs of any particular response actions to any particular species of waste at the Site. Volume of waste disposed at the Site is the most equitable manner of cost allocation and the Court is not hesitant

to use this as its primary equitable factor.⁴³ Additionally, because culpability and cooperation are significant equitable considerations, they will be considered in the allocation equation.

The total volume of waste disposed of at the Site from plaintiffs, settled parties, and

⁴³Carpenter notes in its Proposed Findings of Fact and Conclusions of Law, that this Court previously decided that the Uniform Comparative Fault Act ("UCFA") governs the allocation of the settled parties' share of the liability in this matter. (June 30, 2004 Order.) The UCFA states in relevant part:

A release, covenant not to sue, or similar agreement entered into by a claimant and a person liable discharges that person from all liability for contribution, but it does not discharge any other persons liable upon the same claim unless it so provides. However, the claim of the releasing person against other persons is reduced by the amount of the released person's equitable share of the obligation, determined in accordance with the provisions of Section 2.

UCFA § 6.

Carpenter argues that, because plaintiffs have not disclosed the dollar amounts of their settlements, it is impossible to tell whether it might be more equitable to treat the settlement values as representative of the settled parties' equitable shares of liability. The Court can discern no reason why the settlement values would be a "more equitable" method of allocating liability in this case, and Carpenter has not offered a reason.

Under UCFA, plaintiffs bear the risk that the potential settling defendant's share of the cleanup costs may be greater than the settlement amount. Thus, plaintiffs have every incentive to settle for as close to the settling party's actual share as possible. UCFA states that "the claim of the releasing person against other persons is reduced by the released person's *equitable share of the obligation*." UCFA § 6 (emphasis added). Thus, a defendant's liability is reduced by the settling party's equitable share of the liability, not by the dollar value of the settlement. Just as plaintiffs bear the burden for a shortfall, so they reap the benefit of any windfall. American Cyanamid Co. v. King Industries, Inc., 814 F. Supp. 215, 218 (D. R.I. 1993).

To the extent Carpenter argues that plaintiffs have "not put forth any evidence on the potential equitable share of the liability of any of the settled parties" and therefore failed to meet their burden under § 113(f), this statement is erroneous. (Doc. No. 396, page 33.) Plaintiffs entered into a stipulation with now-settled defendant Handy & Harman Tube Company as to the volume of each plaintiffs' waste that was disposed of at the Boarhead Farms Site. (P-329 ¶ 5.) Although Handy & Harman settled, the stipulation is still evidence of plaintiffs' volumetric share. Although Carpenter did not enter into this particular stipulation, it is nonetheless evidence of plaintiffs volumetric shares. Additionally, Carpenter introduced plaintiffs' answers to contention interrogatories into evidence, and these answers corroborate the volumes of plaintiffs' waste disposed of at the Site. (C-27, Ex. A.) Indeed, some of the plaintiffs' stipulated volumes waste exceed that in the contention interrogatories. (Compare P-329, ¶ 5 with C-27, Ex. A.)

Carpenter is 1,594,668 gallons. The total volume of waste disposed at Boarhead Farms by Carpenter is 998,284 gallons. Carpenter's percentage share of the total volume is 62.60%. Plaintiffs' (including parties with whom plaintiffs have settled) percentage share of the total volume is 37.40%.

Culpability is an appropriate equitable factor in resolving contribution claims.

Browning-Ferris Indus. of Illinois, Inc. v. Ter Maat, 195 F.3d 953, 959 (7th Cir. 1999)

("[B]lameworthiness is relevant to an equitable allocation of joint costs."); Bedford Affiliates v.

Sills, 156 F.3d 416, (2d Cir. 1998) (allocation based on culpability). Carpenter hired Revere

Chemical Company to haul its waste acids, and knew that Manfred DeRewal was the president of that company. Additionally, there is evidence that Carpenter was involved with Manfred

DeRewal, Senior's other waste hauling company, Echo, Incorporated. Carpenter gained actual knowledge of Manfred DeRewal's status as a polluter in 1970 when it learned that both Echo

Incorporated and Revere Chemical Company were shut down for pollution practices.

Nonetheless, Carpenter hired DeRewal Senior again, in the form of DeRewal Chemical Company in June 1973, at costs significantly below the bids of DCC's competitors. The same year,

Carpenter hired Chemline to haul its waste acids—yet another company that Carpenter knew had pollution problems. Thus, Carpenter made the decision to put its harmful wastes into the hands

of DeRewal Senior, a known polluter. Even if, as Carpenter asserts, it was informed by DCC that its wastes would be recycled at Sylvan Chemical Corporation, Carpenter relinquished its

potent waste acids to a known polluter at a cost significantly below competing bids. Thus,

Carpenter's contention that it expected DCC to recycle the waste acid was, at best, negligent and, at worst, purposefully ignorant. Carpenter was on notice that its wastes were very likely being

disposed of in a unsafe an illegal manner since environmental pollution was the established business practice of its chosen vendor. Carpenter's conduct in this case is an important factor which must be considered in determining the parties' allocable equitable shares.

Cooperation with the government is also an appropriate equitable factor to consider in allocating response costs under § 113(f). United States v. Atlas minerals & Chemicals, Inc., 1995 WL 51034 at *230 (E.D. Pa 1995). Cooperation from PRPs in settling with the EPA and agreeing to cleanup Superfund sites is central to furthering the statutory goal of rapid and effective cleanups. In re Tutu Water Wells CERCLA Litig., 326 F.3d 201, 206 (3d Cir. 2003) (citing United States v. Occidental Chem. Corp., 200 F.3d 143, 147 (3d Cir. 1999)). One of CERCLA's underlying policies is to encourage and reward PRPs who settle with the EPA and to create a financial disincentive for PRPs who refuse to cooperate. United States v. Alcan, 25 F.3d 1174, 1184-85 (3d Cir. 1994). Plaintiffs entered into two settlements with EPA in which they reimbursed EPA's past costs claim and agreed to perform the remaining work at the Site. Carpenter received a § 104(e) request and a General/Special Notice Letter from EPA requesting Carpenter to resolve its potential liability to the United States for past response costs and to commit to performing the work required by the ROD, but not included in the 2000 Consent Decree. Carpenter, however, rejected the entreaty. Plaintiffs' cooperation with the EPA and Carpenter's lack of cooperation are equitable factors that this Court will take into consideration in making its allocation.

Carpenter's volumetric share is 62.60%. However, because Carpenter knew that DeRewal to be an egregious polluter, but nonetheless elected to use his discounted services, and also in consideration of Carpenter's decision not to cooperate with the EPA, the Court finds that

a significant increase in Carpenter's equitable share is warranted. Carpenter's equitable share of plaintiffs' response costs through 2007 and plaintiffs future response costs is 80%. Carpenter's equitable share represents its 62.60% volumetric share, plus an additional 8.70% for dealing with a known polluter, plus an additional 8.70% for failure to cooperate with the EPA. Plaintiffs' equitable share is 20%.⁴⁴

F. Recoverable Costs

Plaintiffs' total recoverable response costs through 2007 are \$13,678,378.55. The response costs incurred by plaintiffs were necessary and consistent with the national contingency plan. (J-33 ¶ 60.) Further, "[a]ny response action carried out in compliance with the terms of an order issued by EPA pursuant to section 106 of CERCLA, or a consent decree entered into pursuant to section 122 of CERCLA will be considered consistent with the [National Contingency Plan]." 40 C.F.R. § 300.700(c)(3)(ii) (internal quotations omitted). Carpenter is liable to plaintiffs for 80% of the total recoverable response costs through 2007, which is \$10,942,702.84.

Plaintiffs are also entitled to a declaratory judgment in their favor and against Carpenter. 42 U.S.C. § 9613(g)(2). Carpenter is liable for 80% of all future response costs, as measured from January 1, 2008, for response actions pursuant to the 2000 and 2001 Consent Decrees.

G. Prejudgment Interest

CERCLA § 107 and the HSCA provide for prejudgment interest. An award of prejudgment interest is mandatory under CERCLA § 107. Caldwell Trucking PRP v. Rexion

⁴⁴Pursuant to this Court's previous determination that plaintiffs are responsible for any and all equitable shares of settled parties. (June 30, 2004 Order.)

Technology Corp., 421 F.3d 234, 247 (3d Cir. 2005). Section 113 does not provide for prejudgment interest, however, the Third Circuit in Caldwell Trucking held that an award of prejudgment interest in a contribution claim is discretionary. 421 F.3d at 247.

CERCLA Section 107(a)(4) states:

The amounts recoverable in an action under this section shall include interest on the amounts recoverable under subparagraphs (A) through (D). Such interest shall accrue from the later of (i) the date payment of a specified amount is demanded in writing, or (ii) the date of the expenditure concerned. The rate of interest on the outstanding unpaid balance of the amounts recoverable under this section shall be the same rate as is specified for interest on investments of the Hazardous Substance Superfund established under subchapter A of chapter 98 of Title 26. For purposes of applying such amendments to interest under this subsection, the term "comparable maturity" shall be determined with reference to the date on which interest accruing under this subsection commences.

42 U.S.C. § 9607(a)(4)(D). Plaintiffs' June 18, 2002 Complaint stating that plaintiffs had settled EPA's past costs and thereby incurred \$7,000,000 in costs, satisfies the requirements of § 9607(a)(4)(D). See Bancamerica Commercial Corp. v. Mosher Steel of Kansas, Inc., 100 F.3d 792, 801 (10th Cir. 1996) (holding that complaint notifying defendant that plaintiff incurred in excess of \$1 million in response costs satisfied the requirements of § 9607(a)(4)(D)).

Awarding prejudgment interest is appropriate where a plaintiff has been denied the use of an ascertainable amount of money for a period of time because there is an actual loss. Caldwell Trucking, 421 F.3d at 247. "The purpose of contribution is to equitably apportion response costs among liable parties." Bancamerica Commercial Corp., 100 F.3d at 801. Failure to grant prejudgment interest may result in an inequitable allocation as parties incurring response costs lose the time value of their money. Id. Additionally, declining to grant prejudgment interest in a CERCLA contribution action encourages parties to delay and avoid incurring cleanup costs, which is in contravention to the fundamental purposes of CERCLA. Id.

In the present case, plaintiffs assumed the operation and maintenance of the Site in 2000. They have since agreed to perform all of the remedial work required in the ROD and have settled EPA's past costs claim. As such, plaintiffs have been deprived of the use of millions of dollars which were instead expended on Site remediation. Prejudgment interest is appropriate in this case to compensate plaintiffs for the lost time value of their money.

Consistent with this Court's determination that Carpenter is adjudged liable for 80% of the response costs, plaintiffs are entitled to interest on 80% of the response costs incurred. This interest shall be calculated in accordance with CERCLA at the Superfund rate from the date of the Complaint or the date of the expenditure, whichever occurred later. 42 U.S.C. § 9607(a)(4)(D).

H. Plaintiffs' Claims Under the HSCA.

Carpenter's liability is neither greater nor lesser under the HSCA. As the Pennsylvania equivalent of CERCLA, many of the HSCA's provisions mirror those of the federal act. Indeed, the HSCA, like CERCLA § 113(f), authorizes private parties to seek contribution from other potentially responsible parties. 35 P.S. § 6020.702(a)(3).

Liability is established under the HSCA by establishing: (1) there has been a release or threatened release; (2) of a hazardous substance; (3) from a site, and (4) there is a responsible person as stated in § 701(a). In the present case, Carpenter stipulated that there was a release or threatened release of a hazardous substance at Boarhead Farms. (J-33 ¶ 6.) Additionally, Carpenter stipulated that Boarhead Farms is a 'site' as that term is defined in § 103 of the HSCA. (J-33 ¶ 3.)

Plaintiffs were therefore required to direct their proofs toward establishing Carpenter's

status as a responsible party under § 701(a). Carpenter is a responsible party under § 701(a) because it arranged with DCC by contract for the disposal of a hazardous substance. 35 P.S. § 6020.701(a)(2). The HSCA definition of a hazardous substance encompasses the CERCLA definition of a hazardous substance. 35 P.S. § 6020.103. Therefore, Carpenter's waste acids are hazardous substances as that term is defined in 35 P.S. § 6020.103, for the same reasons the waste acids were hazardous substances under CERCLA. See Section III.D.1.a supra. Carpenter is therefore a liable party under the HSCA.

The HSCA lists factors to be considered in making an equitable allocation. 35 P.S. § 6020.705(b). These factors were considered by the Court in making an allocation under CERCLA § 113(f) and therefore do not change the analysis. Additionally, plaintiffs have already been awarded prejudgment interest on their § 107 and § 113(f) claims.

For all of these reasons, Carpenter's liability under the HSCA parallels its liability under CERCLA.

IV. Conclusion

And now, this 18th day of August 2008, it is ORDERED as follows:

1. Judgment is entered in favor of Cytec Industries, Inc., Ford Motor Company, SPS Technologies, LLC, TI Group Automotive Systems LLC, and Agere Systems, Inc. and against defendant Carpenter on Counts I, II, and V in the amount of \$10,942,702.84.⁴⁵
2. Plaintiffs are entitled to prejudgment interest on 80% of all costs incurred through January 1, 2008.
3. A declaratory judgment is entered in favor of Cytec Industries, Inc., Ford Motor Company, SPS Technologies, LLC, TI Group Automotive Systems LLC, and

⁴⁵The court notes that the 5th Amended Complaint omitted Count IV. Count IV is mislabeled as Count V.

Agere Systems, Inc. and against defendant Carpenter on Count III. Carpenter is liable for 80% of all future costs, as measured from January 1, 2008, for response actions pursuant to the 2000 and 2001 Consent Decrees.

4. Judgment is entered in favor of Carpenter and against Cytec Industries, Inc., Ford Motor Company, SPS Technologies, LLC, TI Group Automotive Systems LLC, and Agere Systems, Inc. On Carpenter's claims for contribution. Plaintiffs are liable for 20% of all past and future response costs.
5. On or before Wednesday, August 20, 2008, Plaintiffs are ORDERED to submit an revised interest calculation in accordance with this Order.

BY THE COURT:

A handwritten signature in black ink, appearing to be 'LD' or similar, written in a cursive style.

Legrome D. Davis, J.